TABLE OF CONTENTS

LIST OF TABLES

9 INTAKE OF FRUITS AND VEGETABLES

9.1 INTRODUCTION

The American food supply is generally considered to be one of the safest in the world. Nevertheless, fruits and vegetables may become contaminated with toxic chemicals by several different pathways. Ambient pollutants from the air may be deposited on or absorbed by the plants, or dissolved in rainfall or irrigation waters that contact the plants. Pollutants may also be absorbed through plant roots from contaminated soil and ground water. The addition of pesticides, soil additives, and fertilizers may also result in contamination of fruits and vegetables. To assess exposure through this pathway, information on fruit and vegetable ingestion rates is needed.

Children's exposure from contaminated fruits and vegetables may differ from that of adults because of differences in the types and amounts of food eaten. Also, for many foods, the intake per unit body weight is greater for children than for adults. Common fruits and vegetables eaten by children include apple juice, fresh apples, orange juice, fresh pears, fresh peaches, carrots, fresh bananas, succulent garden peas, and succulent garden beans (Goldman, 1995).

A variety of terms may be used to define intake of fruits and vegetables (e.g., consumer-only intake, per capita intake, total fruit intake, total vegetable intake, as-consumed intake, dry weight intake). These terms are defined below to assist the reader in interpreting and using the intake rates that are appropriate for the exposure scenario being assessed.

Consumer-only intake is defined as the quantity of fruits and vegetables consumed by children during the survey period. These data are generated by averaging intake across only the children in the survey who consumed these food items. Per capita intake rates are generated by averaging consumer-only intakes over the entire population of children (including those children that reported no intake). In general, per capita intake rates are appropriate for use in exposure assessments for which average dose estimates for children are of interest because they represent both children who ate the foods during the survey period and children who may eat the food items at some time, but did not consume them during the survey period. Per capita intake, therefore, represents an average across the entire population of interest, but does so at the expense of underestimating consumption for the subset of the population that consumed the food in question. Total fruit intake refers to the sum of all fruits consumed in a day including canned, dried, frozen, and fresh fruits. Likewise, total vegetable intake refers to the sum of all vegetables consumed in a day including canned, dried, frozen, and fresh vegetables.

Intake rates may be expressed on the basis of the as-consumed weight (e.g., cooked or prepared) or on the uncooked or unprepared weight. As-consumed intake rates are based on the weight of the food in the form that it is consumed and should be used in assessments where the basis for the contaminant concentrations in foods is also indexed to the as-consumed weight. The food ingestion values provided in this chapter are expressed as as-consumed intake rates because this is the fashion in which data were reported by survey respondents. This is of importance because concentration data to be used in the dose equation are often measured in uncooked food samples. It should be recognized that cooking can either increase or decrease food weight. Similarly, cooking can increase the mass of contaminant in food (due to formation reactions, or absorption from cooking oils or water) or decrease the mass of contaminant in food (due to vaporization, fat loss or leaching). The combined effects of changes in weight and changes in contaminant mass can result in either an increase or decrease in contaminant concentration in cooked food. Therefore, if the as-consumed ingestion rate and the uncooked concentration are used in the dose equation, dose may be under-estimated or over-estimated. Ideally, after-cooking food concentrations should be combined with the as-consumed intake rates. In the absence of data, it is reasonable to assume that no change in contaminant concentration occurs after cooking. It is important for the assessor to be aware of these issues and choose intake rate data that best match the concentration data that are being used. For more information on cooking losses and conversions necessary to account for such losses, the reader is referred to Chapter 13 of this handbook.

Sometimes contaminant concentrations in food are reported on a dry weight basis. When these data are used in an exposure assessment, it is recommended that dry-weight intake rates also be used. Dry-weight food concentrations and intake rates are based on the weight

of the food consumed after the moisture content has been removed. For information on converting the intake rates presented in this chapter to dry weight intake rates, the reader is referred to Section 9.4.

The purpose of this chapter is to provide intake data for fruits and vegetables among children. The recommendations for fruit and vegetable ingestion rates are provided in the next section, along with a summary of the confidence ratings for these recommendations. The recommended values are based on the key study identified by U.S. EPA for this factor. Following the recommendations, the key study on fruit and vegetable ingestion is summarized. Relevant data on ingestion of fruits and vegetables are also provided. These data are presented to provide the reader with added perspective on the current state-of-knowledge pertaining to ingestion of fruits and vegetables.

9.2 RECOMMENDATIONS

Table 9-1 presents a summary of the recommended values for per capita and consumers-only intake of fruits and vegetables, on an as-consumed basis. Confidence ratings for the fruit and vegetable intake recommendations for general population children are provided in Table 9-2.

The U.S. EPA analysis of data from the 1994-96 and 1998 Continuing Survey of Food Intake among Individuals (CSFII) was used in selecting recommended intake rates for general population children. The U.S. EPA analysis was conducted using age groups that differed slightly from U.S. EPA's *Guidance on Selecting Age Groups for Monitoring and Assessing Childhood Exposures to Environmental Contaminants* (U.S. EPA, 2005). However, for the purposes of the recommendations presented here, data were placed in the standardized age categories closest to those used in the analysis. Also, the CSFII data on which the recommendations are based are short-term survey data and may not necessarily reflect the long-term distribution of average daily intake rates. However, for broad categories of food (i.e., total fruits and total vegetables), because they are eaten on a daily basis throughout the year with minimal seasonality, the short term distribution may be a reasonable approximation of the long-term distribution, although it will display somewhat increased variability. This implies that the upper percentiles shown here may tend to overestimate the corresponding percentiles of the true long-term distribution. It should also be noted that because these recommendations are based on 1994-96 and 1998 CSFII data, they may not reflect the most recent changes that may have occurred in consumption patterns. More current data from the National Health and Nutrition Survey (NHANES) will be incorporated as the data become available and are analyzed.

Table 9-1. Recommended Values for Intake of Fruits and Vegetables, As Consumed[a]

Age Group	Per Capita		Consumers Only		Multiple Percentiles	Source
	Mean	95th Percentile	Mean	95th Percentile		
	g/kg-day	g/kg-day	g/kg-day	g/kg-day		
Total Fruits						
Birth to 1 year	5.7	21	10	26	See Tables 9-3 and 9-4	U.S. EPA Analysis of CSFII, 1994-96 and 1998.
1 to <2 years	6.2	19	6.9	19		
2 to < 3 years	6.2	19	6.9	19		
3 to <6 years	4.6	14	5.1	15		
6 to <11 years	2.4	8.8	2.7	9.3		
11 to <16 years	0.8	3.5	1.1	3.8		
16 to <21 years	0.8	3.5	1.1	3.8		
Total Vegetables						
Birth to 1 year	4.5	15	6.2	16	See Tables 9-3 and 9-4	U.S. EPA Analysis of CSFII, 1994-96 and 1998.
1 to <2 years	6.9	17	6.9	17		
2 to <3 years	6.9	17	6.9	17		
3 to <6 years	5.9	15	5.9	15		
6 to <11 years	4.1	9.9	4.1	9.9		
11 to <16 years	2.9	6.9	2.9	6.9		
16 to <21 years	2.9	6.9	2.9	6.9		
Individual Fruits and Vegetables - See Tables 9-5 and 9-6						

[a] Analysis was conducted using slightly different age groups than those recommended in *Guidance on Selecting Age Groups for Monitoring and Assessing Childhood Exposures to Environmental Contaminants* (U.S. EPA. 2005). Data were placed in the standardized age categories closest to those used in the analysis.

Table 9-2. Confidence in Recommendations for Intake of Fruits and Vegetables

General Assessment Factors	Rationale	Rating
Soundness		High for total fruits and vegetables, low for some individual fruits and vegetables with small sample size
Adequacy of Approach	The survey methodology and data analysis was adequate. The survey sampled more than 11,000 individuals up to age 18 years. However, samples size for some individual fruits and vegetables for some of the age groups are small. An analysis of primary data was conducted.	
Minimal (or Defined) Bias	No physical measurements were taken. The method relied on recent recall of fruits and vegetables eaten.	
Applicability and Utility		Medium
Exposure Factor of Interest	The key study was directly relevant to fruit and vegetable intake.	
Representativeness	The data were demographically representative of the U.S. population (based on stratified random sample).	
Currency	Data were collected between 1994 and 1998.	
Data Collection Period	Data were collected for two non-consecutive days.	
Clarity and Completeness		High
Accessibility	The CSFII data are publicly available.	
Reproducibility	The methodology used was clearly described; enough information was included to reproduce the results.	
Quality Assurance	Quality assurance of the CSFII data was good; quality control of the secondary data analysis was not well described.	
Variability and Uncertainty		Medium
Variability in Population	Full distributions were provided for total fruits and total vegetables. Means were provided for individuals fruits and vegetables.	
Uncertainty	Data collection was based on recall of consumption for a 2-day period; the accuracy of using these data to estimate long-term intake (especially at the upper percentiles) is uncertain. However, use of short-term data to estimate chronic ingestion can be assumed for broad categories of foods such as total fruits and total vegetables. Uncertainty is likely to be greater for individual fruits and vegetables.	

Table 9-2. Confidence in Recommendations for Intake of Fruits and Vegetables (continued)

General Assessment Factors	Rationale	Rating
Evaluation and Review		Medium
Peer Review	The USDA CSFII survey received a high level of peer review. The U.S. EPA analysis of these data has not been peer reviewed outside the Agency.	
Number and Agreement of Studies	There was 1 key study.	
Overall Rating		**High** confidence in the averages; **Low** for some individual fruits and vegetables with small sample size **Low** confidence in the long-term upper percentiles

9.3 INTAKE STUDIES

The primary source of recent information on consumption rates of fruits and vegetables among children is the U.S. Department of Agriculture's (USDA) CSFII. Data from the 1994-96 CSFII and the 1998 Children's supplement to the 1994-96 CSFII have been used in various studies to generate children's consumer-only and per capita intake rates for both individual fruits and vegetables and total fruits and vegetables. The CSFII is a series of surveys designed to measure the kinds and amounts of foods eaten by Americans. The CSFII 1994-96 was conducted between January 1994 and January 1997 with a target population of non-institutionalized individuals in all 50 states and Washington, D.C. In each of the 3 survey years, data were collected for a nationally representative sample of individuals of all ages. The CSFII 1998 was conducted between December 1997 and December 1998 and surveyed children 9 years of age and younger. It used the same sample design as the CSFII 1994-96 and was intended to be merged with CSFII 1994-96 to increase the sample size for children. The merged surveys are designated as CSFII 1994-96, 1998. Additional information on these surveys can be obtained at http://www.ars.usda.gov/Services/docs.htm?docid=14531.

The CSFII 1994-96, 1998 collected dietary intake data through in-person interviews on 2 non-consecutive days. The data were based on 24-hour recall. A total of 21,662 individuals provided data for the first day; of those individuals, 20,607 provided data for a second day. Over 11,000 of the sample persons represented children up to 18 years of age. The 2-day response rate for the 1994-1996 CSFII was approximately 76 percent. The 2-day response rate for CSFII 1998 was 82 percent.

The CSFII 1994-96, 98 surveys were based on a complex multistage area probability sample design. The sampling frame was organized using 1990 U.S. population census estimates, and the stratification plan took into account geographic location, degree of urbanization, and socioeconomic characteristics. Several sets of sampling weights are available for use with the intake data. By using appropriate weights, data for all fours years of the surveys can be combined. USDA recommends that all 4 years be combined in order to provide an adequate sample size for children.

9.3.1 Key Fruits and Vegetables Intake Study

9.3.1.1 *U.S. EPA Analysis of CSFII 1994-96, 1998*

For many years, the U.S. EPA's Office of Pesticide Programs (OPP) has used food consumption data collected by the U.S. Department of Agriculture (USDA) for its dietary risk assessments. Most recently, OPP, in cooperation with USDA's Agricultural Research Service (ARS), used data from the 1994-96, 1998 CSFII to develop the Food Commodity Intake Database (FCID). CSFII data on the foods people reported eating were converted to the quantities of agricultural commodities eaten. "Agricultural commodity" is a term used by U.S. EPA to mean plant (or animal) parts consumed by humans as food; when such items are raw or unprocessed, they are referred to as "raw agricultural commodities." For example, an apple pie may contain the commodities apples, flour, fat, sugar and spices. FCID contains approximately 553 unique commodity names and 8-digit codes. The FCID commodity names and codes were selected and defined by U.S. EPA and were based on the U.S. EPA Food Commodity Vocabulary (http://www.epa.gov/pesticides/foodfeed/).

The fruit and vegetable items/groups selected for the U.S. EPA analysis included total fruits and total vegetables, and individual fruits such as: apples, bananas, peaches, pears, strawberries, citrus fruits, pome fruit, stone fruit, and tropical fruits; and individual vegetables such as: asparagus, beets, broccoli, cabbage, carrots, corn, cucumbers, lettuce, okra, onions, peas, peppers, pumpkin, beans, tomatoes, white potatoes, bulb vegetables, fruiting vegetables, leafy vegetables, legumes, and small stalk stem vegetables. Appendix 9A presents the food codes and definitions used to determine the various fruits and vegetables used in the analysis. Intake rates for these food items/groups represent intake of all forms of the product (e.g., both home produced and commercially produced). Children who provided data for two days of the survey were included in the intake estimates. Individuals who did not provide information on body weight or for whom identifying information was unavailable were excluded from the analysis. Two-day average intake rates were calculated for all individuals in the database for each of the food items/groups.

These average daily intake rates were divided by each individual's reported body weight to generate intake rates in units of grams per kilogram of body weight per day (g/kg-day). The data were weighted according to the four-year, two-day sample weights provided in the 1994-96, 1998 CSFII to adjust the data for the sample population to reflect the national population.

Summary statistics were generated on both a per capita and a consumer only basis. For per capita intake, both users and non-users of the food item were included in the analysis. Consumer only intake rates were calculated using data for only those individuals who ate the food item of interest during the survey period. Intake data from the CSFII were based on as-consumed (i.e., cooked or prepared) forms of the food items/groups. Summary statistics, including: number of observations, percentage of the population consuming the fruits or vegetables being analyzed, mean intake rate, and standard error of the mean intake rate were calculated for total fruits, total vegetables, and selected individual fruits and vegetables. Percentiles of the intake rate distribution (i.e., 1st, 5th, 10th, 25th, 50th, 75th, 90th, 95th, 99th, and 100th percentile were also provided for total fruits and total vegetables. Data were provided for the following age groups of children: birth to <1 year, 1 to <2 years, 3 to <5 years, 6 to <12 years, and 13 to <19 years. Because these data were developed for use in U.S. EPA's pesticide registration program, the age groups used are slightly different than those recommended in U.S. EPA's *Guidance on Selecting Age Groups for Monitoring and Assessing Childhood Exposures to Environmental Contaminants* (U.S. EPA, 2005).

Table 9-3 presents as-consumed per capita intake data for total fruits and vegetables in g/kg-day; as-consumed consumer only intake data for total fruits and vegetables in g/kg-day are provided in Table 9-4. Table 9-5 provides per capita intake data for individual fruits and vegetables and Table 9-6 provides consumer only intake data for individual fruits and vegetables.

It should be noted that the distribution of average daily intake rates generated using short-term data (e.g., 2-day) do not necessarily reflect the long-term distribution of average daily intake rates. The distributions generated from short-term and long-term data will differ to the extent that each individual's intake varies from day to day; the distributions will be similar to the extent that individuals' intakes are constant from day to day. Day-to-day variation in intake among individuals will be high for fruits and vegetables that are highly seasonal and for fruits and vegetables that are eaten year-round, but that are not typically eaten every day. For these fruits and vegetables, the intake distribution generated from short-term data will not be a good reflection of the long-term distribution. On the other hand, for broad categories of foods (e.g., total fruits and total vegetables) that are eaten on a daily basis throughout the year, the short-term distribution may be a reasonable approximation of the true long-term distribution, although it will show somewhat more variability. In this chapter, distributions are provided only for broad categories of fruits and vegetables (i.e., total fruits and total vegetables). Because of the increased variability of the short-term distribution, the short-term upper percentiles shown here may overestimate the corresponding percentiles of the long-term distribution. For individual foods, only the mean, standard error, and percent consuming are provided.

The strengths of U.S. EPA's analysis are that it provides distributions of intake rates for various age groups of children, normalized by body weight. The analysis uses the 1994-96, 1998 CSFII data set which was designed to be representative of the U.S. population. The data set includes four years of intake data combined, and is based on a two-day survey period. As discussed above, short-term dietary data may not accurately reflect long-term eating patterns and may under-represent infrequent consumers of a given food. This is particularly true for the tails (extremes) of the distribution of food intake. Also, the analysis was conducted using slightly different age groups than those recommended in U.S. EPA's *Guidance on Selecting Age Groups for Monitoring and Assessing Childhood Exposures to Environmental Contaminants* (U.S. EPA, 2005). However, given the similarities in the age groups used, the data should provide suitable intake estimates for the age groups of interest.

9.3.2 Relevant Fruit and Vegetable Intake Studies

9.3.2.1 *USDA, 1999 - Food and Nutrient Intakes by Children 1994-96, 1998, Table Set 17*

USDA (1999) calculated national probability estimates of food and nutrient intake by children based on all 4 years of the CSFII (1994-96 and 1998) for children age 9 years and under, and on CSFII 1994-96 only for individuals age 10 years and over. Sample weights were used to adjust for non-response, to match the sample to the U.S. population in terms of demographic characteristics, and to equalize intakes over the 4 quarters of the year and the 7 days of the week. A total of 503 breast-fed children were excluded from the estimates, but both consumers and non-consumers were included in the analysis.

USDA (1999) provided data on the mean per capita quantities (grams) of various food products/groups consumed per individual for one day, and the percent of individuals consuming those foods in one day of the survey. Tables 9-7 through 9-10 present data on the mean quantities (grams) of fruits and vegetables consumed per individual for one day, and the percentage of survey individuals consuming fruits and vegetables on that survey day. Data on mean intakes or mean percentages are based on respondents' day-1 intakes.

The advantage of the USDA (1999) study is that it uses the 1994-96, 98 CSFII data set, which includes four years of intake data, combined, and includes the supplemental data on children. These data are expected to be generally representative of the U.S. population and they include data on a wide variety of fruits and vegetables. The data set is one of a series of USDA data sets that are publicly available. One limitation of this data set is that it is based on a one-day, and short-term dietary data may not accurately reflect long-term eating patterns. Other limitations of this study are that it only provides mean values of food intake rates, consumption is not normalized by body weight, and presentation of results is not consistent with U.S. EPA's recommended age groups.

9.3.2.2 *Smiciklas-Wright et al., 2002 - Foods Commonly Eaten in the United States: Quantities Consumed per Eating Occasion and in a Day, 1994-1996*

Using data gathered in the 1994-96 USDA CSFII, Smiciklas-Wright et al. (2002) calculated distributions for the quantities of fruits and vegetables consumed per eating occasion by members of the U.S. population (i.e., serving sizes). The estimates of serving size were based on data obtained from 14,262 respondents, ages 2 years and above, who provided 2 days of dietary intake information. A total of 4,939 of these respondents were children, ages 2 to 19 years of age. Only dietary intake data from users of the specified food were used in the analysis (i.e., consumers only data).

Table 9-1 presents serving size data for selected fruits and vegetables. These data are presented on an as-consumed basis (grams) and represent the quantity of fruits and vegetables consumed per eating occasion. These estimates may be useful for assessing acute exposures to contaminants in specific foods, or other assessments where the amount consumed per eating occasion is necessary. Only the mean and standard deviation serving size data and percent of the population consuming the food during the 2-day survey period are presented in this handbook. Percentiles of serving sizes of the foods consumed by these age groups of the U.S. population can be found in Smiciklas-Wright et al. (2002).

The advantages of using these data are that they were derived from the USDA CSFII and are representative of the U.S. population. The analysis conducted by Smiciklas-Wright et al. (2002) accounted for individual foods consumed as ingredients of mixed foods. Mixed foods were disaggregated via recipe files so that the individual ingredients could be grouped together with similar foods that were reported separately. Thus, weights of foods consumed as ingredients were combined with weights of foods reported separately to provide a more thorough representation of consumption. However, it should be noted that since the recipes for the mixed foods consumed were not provided by the respondents, standard recipes were used. As a result, the estimates of quantity consumed for some food types are based on assumptions about the types and quantities of

ingredients consumed as part of mixed foods. This study used data from the 1994 to 1996 CSFII; data from the 1998 children's supplement were not included.

9.3.2.3 *Fox et al., 2004 - Feeding Infants and Toddlers study: What Foods Are Infants and Toddlers Eating*

Fox et al. (2004) used data from the Feeding Infants and Toddlers study (FITS) to assess food consumption patterns in infants and toddlers. The FITS was sponsored by Gerber Products Company and was conducted to obtain current information on food and nutrient intakes of children, ages 4 to 24 months old, in the 50 states and the District of Columbia. The FITS is described in detail in Devaney et al. (2004). FITS was based on a random sample of 3,022 infants and toddlers for which dietary intake data were collected by telephone from their parents or caregivers between March and July 2002. An initial recruitment and household interview was conducted, followed by an interview to obtain information on intake based on 24-hour recall. The interview also addressed growth, development and feeding patterns. A second dietary recall interview was conducted for a subset of 703 randomly selected respondents. The study over-sampled children in the 4 to 6 and 9 to 11 months age groups; sample weights were adjusted for non-response, over-sampling, and under-coverage of some subgroups. The response rate for the FITS was 73 percent for the recruitment interview. Of the recruited households, there was a response rate of 94 percent for the dietary recall interviews (Devaney et al., 2004). The characteristics of the FITS study population is shown in Table 9-12.

Fox et al. (2004) analyzed the first set of 24-hour recall data collected from all study participants. For this analysis, children were grouped into six age categories: 4 to 6 months, 7 to 8 months, 9 to 11 months, 12 to 14 months, 15 to 18 months, and 19 to 24 months. Table 9-13 provides the percentage of infants and toddlers consuming different types of vegetables at least once in a day. The percentages of children eating any type of vegetable ranged from 39.9 percent for 4 to 6 month olds to 81.6 percent for 19 to 24 month olds. Table 9-14 provides the top five vegetables consumed by age group. Some of the highest percentages ranged from baby food carrots (9.6 percent) in the 4 to 6 month old group to french fries (25.5 percent) in the 19 to 24 month old group. Table 9-15 provides the percentage of children consuming different types of fruit at least once per day. The percentages of children eating any type of fruit ranged from 41.9 percent to 4 to 6 month olds to 77.2 percent for 12 to 14 month olds. Table 9-16 provides information on the top five fruits eaten by infants and toddlers at least once per day. The highest percentages were for bananas among infants 9 to 24 months, and baby food applesauce among infants 4 to 8 months old.

The advantages of this study were that the study population represented the U.S. population and the sample size was large. One limitation of the analysis done by Fox et al. (2004) was that only frequency data were provided; no information on actual intake rates was included. In addition, Devaney et al. (2004) noted several limitations associated with the FITS data. For the FITS, a commercial list of infants and toddlers was used to obtain the sample used in the study. Since many of the households could not be located and did not have children in the target population, a lower response rate than would have occurred in a true national sample was obtained (Devaney et al., 2004). In addition, the sample was likely from a higher socioeconomic status when compared with all U.S. infants in this age group (4 to 24 months old) and the use of a telephone survey may have omitted lower-income households without telephones (Devaney et al., 2004).

9.3.2.4 *Ponza et al., 2004 - Nutrient Food Intakes and Food Choices of Infants and Toddlers Participating in WIC*

Ponza et al. (2004) conducted a study using selected data from the FITS to assess feeding patterns, food choices and nutrient intake of infants and toddlers participating in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Ponza et al. (2004) evaluated FITS data for the following age groups: 4 to 6 months (N = 862), 7 to 11 months (N = 1,159) and 12 to 24 months (N= 996). The total sample size described by WIC participants and non-participants is shown in Table 9-17.

The foods consumed were analyzed by tabulating the percentage of infants who consumed specific foods/food groups per day (Ponza et al., 2004).

Weighted data were used in all of the analyses used in the study (Ponza et al., 2004). Table 9-17 presents the demographic data for WIC participants and non-participants. Table 9-18 provides information on the food choices for the infants and toddlers studied. There was little difference in vegetable choices among WIC participants and non-participants (Table 9-18). However, there were some differences for fruits.

An advantage of this study is that it had a relatively large sample size and was representative of the U.S. general population of infants and children. A limitation of the study is that intake values for foods were not provided. Other limitations are those associated with the FITS data, as described previously in Section 9.3.2.3.

9.3.2.5 *Menella et al., 2006 - Feeding Infants and Toddlers Study: The Types of Foods Fed to Hispanic Infants and Toddlers*

Menella et al. (2006) investigated the types of food and beverages consumed by Hispanic infants and toddlers in comparison to the non-Hispanic infants and toddlers in the United States. The FITS 2002 data for children between 4 and 24 months of age were used for the study. The data represent a random sample of 371 Hispanic and 2,367 non-Hispanic infants and toddlers (Menella et al., 2006). Menella et al. (2006) grouped the infants as follows: 4 to 5 months (N = 84 Hispanic; 538 non-Hispanic), 6 to 11 months (N = 163 Hispanic and 1,228 non-Hispanic), and 12 to 24 months (N = 124 Hispanic and 871 non-Hispanic) of age.

Table 9-19 provides the percentages of Hispanic and non-Hispanic infants and toddlers consuming fruits and vegetables. In most instances the percentages consuming the different types of fruits and vegetables were similar. However, 4 to 5 month old Hispanic infants were more likely to eat fruits than non-Hispanic infants in this age group. Table 9-20 provides the top five fruits and vegetables consumed and the percentage of children consuming these foods at least once in a day. Apples and bananas were the foods with the highest percent consuming for both the Hispanic and non-Hispanic study groups. Potatoes and carrots were the vegetables with the highest percentage of infants and toddlers consuming in both study groups.

The advantage of the study is that it provides information on food preferences for Hispanic and non-Hispanic infants and toddlers. A limitation is that the study did not provide food intake data, but provided frequency of use data instead. Other limitations are those noted previously in Section 9.3.2.3 for the FITS data.

9.3.2.6 *Fox et al., 2006 - Average Portion of Foods Commonly Eaten by Infants and Toddlers in the United States*

Fox et al. (2006) estimated average portion sizes consumed per eating occasion by children 4 to 24 months of age who participated in the Feeding Infant and Toddlers Study (FITS). The FITS is a cross-sectional study designed to collect and analyze data on feeding practices, food consumption, and usual nutrient intake of U.S. infants and toddlers and is described in Section 9.3.2.3 of this chapter. It included a stratified random sample of 3,022 children between 4 and 24 months of age.

Using the 24-hour recall data, Fox et al. (2006) derived average portion sizes for major food groups, including fruits and vegetables. Average portion sizes for select individual foods within these major groups were also estimated. For this analysis, children were grouped into six age categories: 4 to 5 months, 6 to 8 months, 9 to 11 months, 12 to 14 months, 15 to 18 months, and 19 to 24 months. Tables 9-21 and 9-22 present the average portion sizes for fruits and vegetables for infants and toddlers, respectively.

9.4 CONVERSION BETWEEN WET AND DRY WEIGHT INTAKE RATES

The intake data presented in this chapter are reported in units of wet weight (i.e., as-consumed fruits and vegetables consumed per day or per eating occasion). However, data on the concentration of contaminants in fruits and vegetables may be reported in units of either wet or dry weight.(e.g., mg contaminant per gram-dry-weight of fruits and vegetables.) It is essential that exposure assessors be aware of this difference so that they may ensure consistency between the units used for intake rates and those used for concentration data (i.e., if the contaminant concentration is measured in dry weight of fruits and vegetables, then the dry weight units should be used for their intake values).

If necessary, wet weight (e.g., as-consumed) intake rates may be converted to dry weight intake rates using the moisture content percentages presented in Table 9-23 and the following equation:

$$IR_{dw} = IR_{ww}\left[\frac{100 - W}{100}\right] \qquad \text{(Eqn. 9-1)}$$

where:

IR_{dw}	=	dry weight intake rate;
IR_{ww}	=	wet weight intake rate; and
W	=	percent water content

Alternatively, dry weight residue levels in fruits and vegetables may be converted to wet weight residue levels for use with wet weight (e.g., as-consumed) intake rates as follows:

$$C_{ww} = C_{dw}\left[\frac{100 - W}{100}\right] \qquad \text{(Eqn. 9-2)}$$

where:

C_{ww}	=	wet weight intake rate;
C_{dw}	=	dry weight intake rate; and
W	=	percent water content.

The moisture data presented in Table 9-23 are for selected fruits and vegetables taken from USDA (2007).

9.5 REFERENCES FOR CHAPTER 9

Devaney, B.; Kalb, L.; Briefel, R.; Zavitsky-Novak, T.; Clusen, N.; Ziegler, P. (2004) Feeding infants and toddlers study: overview of the study design. J Am Diet Assoc 104(Suppl 1): S8-S13.

Fox, M.K.; Pac, S.; Devaney, B.; Jankowski, L. (2004) Feeding Infants and Toddlers Study: what foods are infants and toddlers eating. J Am Diet Assoc 104 (Suppl):S22-S30.

Fox, M.K.; Reidy, K.; Karwe, V.; Ziegler, P. (2006) Average portions of foods commonly eaten by infants and toddlers in the United States. J Am Diet Assoc 106 (Suppl 1):S66-S76.

Goldman, L. (1995) Children - unique and vulnerable. Environmental risks facing children and recommendations for response. Environ Health Perspect 103(6):13-17.

Mennella, J.; Ziegler, P.; Briefel, R.; Novak, T. (2006) Feeding Infants and Toddlers Study: the types of foods fed to Hispanic infants and toddlers. J Am Diet Assoc 106 (Suppl 1): S96-S106.

Ponza, M.; Devaney, B.; Ziegler, P.; Reidy, K.; Squatrito, C. (2004) Nutrient intakes and food choices of infants and toddlers participating in WIC. J Am Diet Assoc 104 (Suppl): S71-S79.

Smiciklas-Wright, H.; Mitchell, D.C.; Mickle, S.J.; Cook, A.J.; Goldman, J.D. (2002) Foods commonly eaten in the United States: Quantities consumed per eating occasion and in a day, 1994-1996. U.S. Department of Agriculture NFS Report No. 96-5, pre-publication version, 252 pp.

USDA. (1999) Food and nutrient intakes by children 1994-96, 1998: Table Set 17. Beltsville, MD: Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service, U.S. Department of Agriculture.

USDA (2007) USDA National Nutrient Database for Standard Reference, Release 20. Agricultural Research Service Nutrient Data Laboratory Home Page, http://www.ars.usda.gov/ba/bhnrc/ndl

U.S. EPA. (2005) Guidance on Selecting Age Groups for Monitoring and Assessing Childhood Exposures to Environmental Contaminants. U.S. Environmental Protection Agency, Washington, D.C., EPA/630/P-03/003F.

Table 9-3. Per Capita Intake of Fruits and Vegetables (g/kg-day as consumed)

Age Group	N	Percent Consuming	Mean	SE	Percentiles									
					1st	5th	10th	25th	50th	75th	90th	95th	99th	100th
Fruits														
Birth to 1 year	1,486	56.4	5.7	0.3	0.0	0.0	0.0	0.0	1.5	9.6	17.1	21.3	32.2	73.8
1 to 2 years	2,096	89.5	6.2	0.2	0.0	0.0	0.0	0.5	4.7	9.4	14.6	18.5	26.4	44.0
3 to 5 years	4,391	90.0	4.6	0.1	0.0	0.0	0.0	0.2	3.2	7.0	11.4	14.4	22.3	45.5
6 to 12 years	2,089	88.3	2.4	0.1	0.0	0.0	0.0	0.1	1.3	3.3	6.4	8.8	14.3	25.0
13 to 19 years	1,222	73.2	0.8	0.1	0.0	0.0	0.0	0.0	0.1	1.1	2.4	3.5	6.9	12.8
Vegetables														
Birth to 1 year	1,486	72.1	4.5	0.2	0.0	0.0	0.0	0.0	2.7	7.4	12.2	14.8	25.3	56.8
1 to 2 years	2,096	99.7	6.9	0.2	0.0	0.7	1.5	3.2	5.6	9.3	13.9	17.1	26.5	58.2
3 to 5 years	4,391	100.0	5.9	0.1	0.0	0.8	1.4	2.8	4.7	7.7	11.7	14.7	23.4	50.9
6 to 12 years	2,089	99.9	4.1	0.1	0.1	0.6	1.0	1.8	3.2	5.3	7.8	9.9	17.4	53.7
13 to 19 years	1,222	100.0	2.9	0.1	0.0	0.4	0.7	1.4	2.4	3.8	5.5	6.9	11.4	29.5

N = Sample size.
SE = Standard error.

Source: Based on unpublished U.S. EPA analysis of 1994-96, 1998 CSFII.

Table 9-4. Consumer Only Intake of Fruits and Vegetables (g/kg-day as consumed)

Age Group	N	Mean	SE	Percentiles									
				1st	5th	10th	25th	50th	75th	90th	95th	99th	100th
Fruits													
Birth to 1 year	830	10.1	0.4	0.0	0.4	1.2	3.7	8.5	14.4	20.4	26.4	34.7	73.8
1 to 2 years	1,878	6.9	0.2	0.0	0.0	0.1	2.2	5.4	10.1	15.3	19.0	27.1	44.0
3 to 5 years	3,957	5.1	0.1	0.0	0.0	0.0	1.0	3.8	7.5	11.9	15.0	22.8	45.5
6 to 12 years	1,846	2.7	0.1	0.0	0.0	0.0	0.3	1.7	3.7	6.7	9.3	14.8	25.0
13 to 19 years	898	1.1	0.1	0.0	0.0	0.0	0.0	0.5	1.5	2.9	3.7	7.6	12.8
Vegetables													
Birth to 1 year	1,062	6.2	0.3	0.0	0.1	0.1	2.0	4.9	9.4	13.4	16.1	26.4	56.8
1 to 2 years	2,090	6.9	0.2	0.0	0.7	1.5	3.2	5.6	9.3	13.9	17.1	26.5	58.2
3 to 5 years	4,389	5.9	0.1	0.0	0.8	1.4	2.8	4.7	7.7	11.7	14.7	23.4	50.9
6 to 12 years	2,087	4.1	0.1	0.1	0.6	1.0	1.8	3.2	5.3	7.8	9.9	17.4	53.7
13 to 19 years	1,222	2.9	0.1	0.0	0.4	0.7	1.4	2.4	3.8	5.5	6.9	11.4	29.5

N = Sample size.
SE = Standard error.

Source: Based on unpublished U.S. EPA analysis of 1994-96, 1998 CSFII.

Table 9-5. Per Capita Intake of Individual Fruits and Vegetables (g/kg-day as consumed)

Age Group	N	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE
		Apples			Asparagus			Bananas			Beans		
Birth to 1 year	1,486	34.6	2.32	0.13	0.21	0.01	0.00	40.68	1.24	0.06	21.6	0.43	0.04
1 to 2 years	2,096	44.8	1.79	0.09	0.77	0.02	0.01	62.76	1.77	0.09	46.8	0.76	0.04
3 to 5 years	4,391	44.6	1.64	0.05	0.54	0.01	0.00	60.74	0.93	0.04	43.0	0.52	0.02
6 to 12 years	2,089	38.2	0.83	0.05	0.66	0.01	0.00	57.69	0.38	0.03	38.8	0.32	0.02
13 to 19 years	1,222	22.5	0.20	0.02	0.56	0.00	0.00	42.09	0.13	0.02	55.4	0.15	0.02
		Beets			Berries and Small Fruit			Broccoli			Bulb Vegetables		
Birth to 1 year	1,486	0.4	0.01	0.01	16.5	0.13	0.02	3.5	0.07	0.02	33.4	0.07	0.01
1 to 2 years	2,096	0.7	0.01	0.00	66.2	0.91	0.05	12.0	0.25	0.03	93.3	0.30	0.01
3 to 5 years	4,391	0.8	0.01	0.00	72.7	0.72	0.03	10.7	0.18	0.01	95.8	0.27	0.01
6 to 12 years	2,089	0.8	0.01	0.00	73.4	0.40	0.03	11.0	0.14	0.02	97.3	0.21	0.01
13 to 19 years	1,222	0.7	0.00	0.00	97.7	0.19	0.01	8.3	0.06	0.01	12.3	0.11	0.02
		Cabbage			Carrots			Citrus Fruits			Corn		
Birth to 1 year	1,486	1.0	0.01	0.00	12.3	0.17	0.03	2.5	0.07	0.02	46.0	0.48	0.03
1 to 2 years	2,096	8.0	0.06	0.01	46.8	0.41	0.02	15.5	0.47	0.05	96.5	1.13	0.05
3 to 5 years	4,391	8.9	0.07	0.01	46.2	0.34	0.02	18.2	0.50	0.03	98.7	1.24	0.03
6 to 12 years	2,089	9.5	0.06	0.01	44.4	0.22	0.01	16.0	0.26	0.02	98.9	0.87	0.03
13 to 19 years	1,222	9.0	0.04	0.01	40.3	0.11	0.01	12.3	0.11	0.02	95.7	0.43	0.02

Table 9-5. Per Capita Intake of Individual Fruits and Vegetables (g/kg-day as consumed) (continued)

Age Group	N	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE
		Cucumbers			Cucurbits			Fruiting Vegetables			Leafy Vegetables		
Birth to 1 year	1,486	1.7	0.00	0.00	14.0	0.45	0.04	25.50	0.32	0.04	44.2	0.29	0.05
1 to 2 years	2,096	20.5	0.11	0.01	31.3	0.72	0.06	92.14	1.56	0.06	82.1	0.71	0.04
3 to 5 years	4,391	29.3	0.16	0.02	38.7	0.83	0.07	95.38	1.46	0.03	86.9	0.67	0.02
6 to 12 years	2,089	32.6	0.14	0.02	39.9	0.54	0.06	95.87	1.05	0.03	89.5	0.55	0.03
13 to 19 years	1,222	41.3	0.11	0.03	46.7	0.32	0.08	96.08	0.79	0.03	90.3	0.43	0.02
		Legumes			Lettuce			Okra			Onions		
Birth to 1 year	1,486	51.7	1.21	0.06	1.1	0.00	0.00	0.2	0.00	0.00	32.8	0.07	0.01
1 to 2 years	2,096	96.9	1.30	0.08	23.3	0.14	0.01	1.3	0.01	0.00	93.0	0.29	0.01
3 to 5 years	4,391	98.3	0.85	0.06	33.4	0.21	0.01	0.8	0.01	0.00	95.6	0.26	0.01
6 to 12 years	2,089	98.1	0.48	0.03	41.7	0.22	0.01	1.3	0.01	0.00	96.8	0.20	0.01
13 to 19 years	1,222	94.9	0.27	0.02	55.2	0.22	0.02	0.8	0.00	0.00	97.3	0.18	0.01
		Peaches			Pears			Peas			Peppers		
Birth to 1 year	1,486	24.4	0.85	0.08	15.9	0.73	0.07	29.5	0.47	0.04	15.6	0.01	0.00
1 to 2 years	2,096	50.7	0.47	0.04	17.2	0.40	0.04	28.3	0.34	0.03	77.5	0.05	0.01
3 to 5 years	4,391	55.4	0.26	0.02	16.6	0.26	0.03	20.5	0.21	0.02	84.6	0.05	0.00
6 to 12 years	2,089	54.7	0.14	0.02	17.5	0.14	0.01	17.2	0.12	0.01	85.1	0.05	0.00
13 to 19 years	1,222	39.1	0.06	0.01	5.9	0.03	0.01	14.0	0.07	0.01	84.8	0.04	0.00

Table 9-5. Per Capita Intake of Individual Fruits and Vegetables (g/kg-day as consumed) (continued)

Age Group	N	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE
		Pome Fruit			Pumpkins			Root Tuber Vegetables			Stalk, Stem Vegetables		
Birth to 1 year	1,486	40.0	3.04	0.17	0.3	0.00	0.00	61.7	2.60	0.15	1.9	0.01	0.00
1 to 2 years	2,096	52.0	2.19	0.10	0.7	0.01	0.00	99.6	3.38	0.09	13.2	0.06	0.01
3 to 5 years	4,391	51.7	1.90	0.06	0.9	0.01	0.00	100.0	2.96	0.07	10.9	0.04	0.00
6 to 12 years	2,089	47.9	0.97	0.06	1.8	0.01	0.00	100.0	2.09	0.07	10.7	0.03	0.01
13 to 19 years	1,222	26.5	0.23	0.02	1.3	0.01	0.00	99.9	1.36	0.06	16.6	0.03	0.01
		Strawberries			Stone Fruit			Tomatoes			Tropical Fruits		
Birth to 1 year	1,486	6.8	0.02	0.00	29.20	1.15	0.10	21.5	0.30	0.03	42.2	1.31	0.07
1 to 2 years	2,096	33.5	0.19	0.03	53.62	0.60	0.04	80.7	1.50	0.05	70.1	1.97	0.10
3 to 5 years	4,391	37.1	0.14	0.01	57.45	0.38	0.02	85.7	1.40	0.03	69.7	1.10	0.04
6 to 12 years	2,089	37.3	0.10	0.01	56.83	0.23	0.02	86.9	1.00	0.03	67.0	0.50	0.04
13 to 19 years	1,222	26.8	0.05	0.01	41.08	0.09	0.01	90.2	0.74	0.03	54.5	0.19	0.02
		White Potatoes											
Birth to 1 year	1,486	39.9	0.64	0.07									
1 to 2 years	2,096	91.2	1.95	0.08									
3 to 5 years	4,391	95.1	1.75	0.06									
6 to 12 years	2,089	93.9	1.21	0.06									
13 to 19 years	1,222	92.6	0.93	0.05									

SE = Standard error.

Note: Data for fruits and vegetables for which only small percentages of the population reported consumption may be less reliable than data for fruits and vegetables with higher percentages consuming.

Source: Based on unpublished U.S. EPA analysis of 1994-96, 1998 CSFII.

Table 9-6. Consumer Only Intake of Individual Fruits and Vegetables (g/kg-day as consumed)												
Age Group	N	Mean	SE	N	Mean	SE	N	Mean	SE	N	Mean	SE
	Apples			Asparagus			Bananas			Beans		
Birth to 1 year	496	6.71	0.31	3	2.59	1.16	605	3.04	0.12	313	2.00	0.16
1 to 2 years	947	4.00	0.15	19	1.99	0.54	1,328	2.82	0.12	996	1.63	0.08
3 to 5 years	1,978	3.68	0.08	23	1.37	0.32	2,746	1.54	0.06	1,909	1.22	0.04
6 to 12 years	792	2.17	0.12	13	1.77	0.43	1,214	0.66	0.05	833	0.82	0.05
13 to 19 years	271	0.90	0.06	4	0.56	0.08	511	0.30	0.04	472	0.49	0.03
	Beets			Berries and Small Fruits			Broccoli			Bulb Vegetables		
Birth to 1 year	6	1.42	0.87	229	0.81	0.07	49	2.09	0.33	489	0.22	0.02
1 to 2 years	13	0.98	0.32	1,396	1.38	0.06	242	2.11	0.16	1,957	0.32	0.01
3 to 5 years	36	0.90	0.20	3,166	0.99	0.04	475	1.67	0.09	4,207	0.28	0.01
6 to 12 years	16	0.66	0.33	1,523	0.54	0.04	213	1.29	0.16	2,040	0.22	0.01
13 to 19 years	9	0.20	0.12	679	0.27	0.03	102	0.69	0.07	1,194	0.20	0.01
	Cabbage			Carrots			Citrus Fruits			Corn		
Birth to 1 year	15	0.61	0.41	179	1.39	0.20	37	2.79	0.53	671	1.05	0.07
1 to 2 years	160	0.73	0.11	999	0.87	0.05	336	3.06	0.20	2,027	1.17	0.05
3 to 5 years	369	0.78	0.07	2,048	0.74	0.03	751	2.75	0.15	4,334	1.26	0.03
6 to 12 years	190	0.63	0.11	904	0.50	0.03	324	1.60	0.12	2,064	0.88	0.03
13 to 19 years	106	0.40	0.06	482	0.27	0.02	157	0.90	0.15	1,176	0.45	0.01

Table 9-6. Consumer Only Intake of Individual Fruits and Vegetables (g/kg-day as consumed) (continued)

Age Group	N	Mean	SE	N	Mean	SE	N	Mean	SE	N	Mean	SE
	Cucumbers			Cucurbits			Fruiting Vegetables			Leafy Vegetables		
Birth to 1 year	25	0.28	0.11	213	3.19	0.29	371	1.24	0.11	639	0.65	0.11
1 to 2 years	439	0.52	0.05	682	2.29	0.17	1,927	1.70	0.06	1,729	0.87	0.05
3 to 5 years	1,266	0.56	0.05	1,694	2.15	0.17	4,180	1.53	0.03	3,815	0.77	0.03
6 to 12 years	667	0.43	0.06	833	1.34	0.15	2,014	1.10	0.03	1,860	0.62	0.03
13 to 19 years	500	0.26	0.06	563	0.69	0.16	1,176	0.82	0.03	1,101	0.47	0.02
	Legumes			Lettuce			Okra			Onions		
Birth to 1 year	754	2.34	0.11	15	0.17	0.02	4	1.50	0.54	481	0.22	0.02
1 to 2 years	2,037	1.34	0.08	481	0.58	0.04	29	0.64	0.19	1,948	0.31	0.01
3 to 5 years	4,308	0.86	0.06	1,415	0.62	0.03	34	1.16	0.32	4,200	0.27	0.01
6 to 12 years	2,045	0.49	0.03	858	0.53	0.02	21	0.62	0.15	2,030	0.21	0.01
13 to 19 years	1,168	0.29	0.02	669	0.40	0.03	12	0.43	0.13	1,190	0.19	0.01
	Peaches			Pears			Peas			Peppers		
Birth to 1 year	344	3.47	0.28	217	4.55	0.28	417	1.60	0.09	224	0.05	0.01
1 to 2 years	1,067	0.93	0.08	354	2.33	0.16	609	1.21	0.06	1,627	0.06	0.01
3 to 5 years	2,461	0.48	0.03	711	1.59	0.12	888	1.02	0.07	3,706	0.06	0.00
6 to 12 years	1,150	0.26	0.03	382	0.81	0.07	346	0.68	0.06	1,784	0.05	0.01
13 to 19 years	480	0.15	0.03	72	0.45	0.09	168	0.48	0.06	1,041	0.05	0.00

Table 9-6. Consumer Only Intake of Individual Fruits and Vegetables (g/kg-day as consumed) (continued)

Age Group	N	Mean	SE	N	Mean	SE	N	Mean	SE	N	Mean	SE
	Pome Fruit			Pumpkins			Root Tuber Vegetables			Stalk, Stem Vegetables		
Birth to 1 year	572	7.60	0.34	3	1.06	0.71	916	4.21	0.19	24	0.56	0.22
1 to 2 years	1,097	4.21	0.13	15	1.08	0.51	2,087	3.40	0.09	272	0.48	0.05
3 to 5 years	2,291	3.68	0.08	36	0.56	0.10	4,388	2.96	0.07	502	0.38	0.03
6 to 12 years.	1,012	2.03	0.10	37	0.52	0.11	2,089	2.09	0.07	218	0.32	0.04
13 to 19 years	320	0.87	0.06	14	0.42	0.16	1,221	1.36	0.06	190	0.20	0.03
	Strawberries			Stone Fruit			Tomatoes			Tropical Fruits		
Birth to 1 year	96	0.26	0.06	418	3.95	0.25	315	1.42	0.13	630	3.09	0.12
1 to 2 years	729	0.57	0.08	1,130	1.13	0.08	1,684	1.86	0.06	1,476	2.81	0.12
3 to 5 years	1,710	0.38	0.03	2,556	0.66	0.03	3,764	1.63	0.03	3,106	1.57	0.05
6 to 12 years.	783	0.28	0.02	1,194	0.41	0.03	1,832	1.15	0.03	1,407	0.75	0.05
13 to 19 years	326	0.18	0.03	508	0.21	0.03	1,098	0.82	0.03	652	0.35	0.04
	White Potatoes											
Birth to 1 year	577	1.60	0.15									
1 to 2 years	1,918	2.14	0.09									
3 to 5 years	4,147	1.84	0.06									
6 to 12 years.	1,963	1.29	0.06									
13 to 19 years	1,131	1.01	0.05									

SE = Standard error.

Note: Data for fruits and vegetables for which only small percentages of the population reported consumption may be less reliable than data for fruits and vegetables with higher percentages consuming.

Source: Based on unpublished U.S. EPA analysis of 1994-96, 1998 CSFII.

Table 9-7. Mean Quantities of Vegetables Consumed Daily by Sex and Age, Per Capita (g/day)

Age Group	Sample Size	Total	White Potatoes		Dark Green Vegetables	Deep Yellow Vegetables	Tomatoes	Lettuce, lettuce-based salads	Green beans	Corn, green peas, lima beans	Other vegetables
			Total	Fried							
Males and Females											
Under 1 year	1,126	57	9	1	2	19	1[a]	[a,b]	6	5	16
1 year	1,016	79	26	11	5	9	7	1	8	9	16
2 years	1,102	87	32	17	4	5	11	2	7	10	17
1 to 2 years	2,118	83	29	14	5	7	9	1	7	9	17
3 years	1,831	91	34	17	5	5	13	2	5	11	16
4 years	1,859	97	37	19	6	5	11	3	5	12	18
5 years	884	103	44	22	4	6	12	3	6	12	17
3 to 5 years	4,574	97	38	20	5	5	12	3	5	11	17
5 years and under	7,818	88	31	16	4	7	10	2	6	10	17
Males											
6 to 9 years	787	110	47	26	4	5	16	5	5	11	16
6 to 11 yers	1,031	115	50	27	5	5	16	5	5	11	18
12 to 19 years	737	176	85	44	6	6	28	12	3[a]	10	25
Females											
6 to 9 years	704	110	42	22	5	4	14	6	5	13	21
6 to 11 years	969	116	46	25	5	4	15	7	5	12	22
12 to 19 years	732	145	61	31	9	4	18	12	4	8	28
Males and Females											
9 years and under	9,309	97	37	19	4	6	12	3	6	11	18
19 years and under	11,287	125	53	27	6	6	17	7	5	10	22

[a] Estimate is not statistically reliable due to small samples size reporting intake.
[b] Value less than 0.5, but greater than 0.

Note: Consumption amounts shown are representative of the first day of each participant's survey response.

Source: USDA, 1999.

Table 9-8. Percentage of Individuals Consuming Vegetables, by Sex and Age (%)

Age Group	Sample Size	Total	White Potatoes		Dark Green Vegetables	Deep Yellow Vegetables	Tomatoes	Lettuce, lettuce-based salads	Green beans	Corn, green peas, lima beans	Other vegetables
			Total	Fried							
Males and Females											
Under 1 year	1,126	47.2	12.3	4.3	2.3	20.5	1.8	0.2[a]	7.8	8.5	14.8
1 year	1,016	73.3	40.4	25.2	6.4	13.3	18.0	3.9	13.7	17.6	19.4
2 years	1,102	78.4	46.7	34.5	7.6	10.5	30.8	7.5	11.5	15.0	22.3
1 to 2 years	2,118	75.9	43.6	29.9	7.0	11.8	24.6	5.7	12.6	16.2	20.9
3 years	1,831	80.5	46.7	34.7	7.0	10.7	34.1	8.3	10.1	14.6	24.7
4 years	1,859	80.7	47.3	34.8	7.2	12.0	33.0	10.0	9.0	16.4	26.5
5 years	884	83.0	50.7	38.3	4.6	13.3	36.5	13.4	10.4	16.1	28.8
3 to 5 years	4,574	81.4	48.2	35.9	6.3	12.0	34.5	10.6	9.9	15.7	26.7
5 years and under	7,818	75.4	42.3	30.1	6.1	13.0	27.2	7.6	10.5	15.0	23.3
Males											
6 to 9 years	787	78.8	47.9	38.0	6.3	12.5	38.2	13.1	7.8	15.0	29.7
6 to 11 years	1,031	79.3	48.7	38.4	6.1	12.4	38.7	13.9	6.7	13.8	30.8
12 to 19 years	737	78.2	49.5	38.6	3.6	8.0	43.0	23.8	3.5	7.4	33.2
Females											
6 to 9 years	704	80.5	48.2	36.3	5.9	11.9	33.8	15.8	8.4	15.9	26.6
6 to 11 years	969	81.7	50.8	38.9	5.4	11.4	33.5	17.1	7.8	15.1	29.2
12 to 19 years	732	79.5	46.4	34.6	7.0	10.6	35.3	25.1	4.4	7.4	34.5
Males and Females											
9 years and under	9,309	77.1	44.6	32.9	6.1	12.7	30.7	10.3	9.6	15.2	25.2
19 years and under	11,287	78.3	46.8	35.3	5.6	11.2	34.6	16.6	7.0	11.9	29.4

[a] Estimate is not statistically reliable due to small samples size reporting intake.

Note: Percentages shown are representative of the first day of each participant's survey response.

Source: USDA, 1999.

Table 9-9. Mean Quantities of Fruits Consumed Daily by Sex and Age, Per Capita (g/day)

Age Group	Sample Size	Total	Citrus Fruits and Juices		Dried fruits	Other fruits, mixtures, and juices					
			Total	Juices		Total	Apples	Bananas	Melons and berries	Other fruits and mixtures (mainly fruit)	Non-citrus juices and nectars
Males and Females											
Under 1 year	1,126	131	4	4	-[a,b]	126	14	10	1[a]	39	61
1 year	1,016	267	47	42	2	216	22	23	8	29	134
2 years	1,102	276	65	56	2	207	27	20	10	20	130
1 to 2 years	2,118	271	56	49	2	212	24	22	9	24	132
3 years	1,831	256	61	51	1	191	27	18	13	24	110
4 years	1,859	243	62	52	1	177	31	17	14	22	92
5 years	884	218	55	44	-[a,b]	160	31	14	13	24	78
3 to 5 years	4,574	239	59	49	1	176	30	16	13	23	93
5 years and under	7,818	237	52	44	1	182	26	17	10	26	103
Males											
6 to 9 years	787	194	58	51	-[a,b]	133	32	11	21	20	50
6 to 11 years	1,031	183	67	60	-[a,b]	113	28	11	16	19	40
12 to 19 years	737	174	102	94	1[a]	70	13	8	11[a]	10	29
Females											
6 to 9 years	704	180	63	54	1[a]	113	23	10	10	25	46
6 to 11 years	969	169	64	54	-[a,b]	103	21	8	8	23	42
12 to 19 years	732	157	72	67	-[a,b]	83	13	5	15	14	35
Males and Females											
9 years and under	9,309	217	55	47	1	159	27	15	12	24	81
19 years and under	11,287	191	70	62	1	118	21	11	12	19	56

[a] Estimate is not statistically reliable due to small samples size reporting intake.
[b] Value less than 0.5, but greater than 0.
Note: Consumption amounts shown are representative of the first day of each participant's survey response

Source: USDA, 1999.

Table 9-10. Percentage of Individuals Consuming, Fruits by Sex and Age (%)

Age Group	Sample Size	Total	Citrus Fruits and Juices		Dried fruits	Other fruits, mixtures, and juices					
			Total	Juices		Total	Apples	Bananas	Melons and berries	Other fruits and mixtures (mainly fruit)	Non-citrus juices and nectars
Males and Females											
Under 1 year	1,126	59.7	3.6	2.7	0.4[a]	59.0	15.7	13.3	1.8	29.9	33.0
1 year	1,016	81.0	23.6	19.0	5.9	73.0	23.4	25.1	6.9	26.5	43.2
2 years	1,102	76.6	30.6	23.4	5.3	64.7	24.0	20.2	8.5	19.4	37.0
1 to 2 years	2,118	78.8	27.2	21.3	5.6	68.8	23.7	22.6	7.7	22.9	40.0
3 years	1,831	74.5	27.9	21.4	4.1	64.2	22.4	17.5	7.8	20.1	33.3
4 years	1,859	72.6	28.0	21.8	3.0	62.1	23.7	15.7	7.6	20.0	30.8
5 years	884	67.6	26.9	19.5	1.3[a]	56.9	21.9	12.6	7.4	19.0	24.5
3 to 5 years	4,574	71.6	27.6	20.9	2.8	61.0	22.7	15.3	7.6	19.7	29.5
5 years and under	7,818	72.6	24.6	18.8	3.5	63.5	22.2	17.6	6.9	22.0	33.5
Males											
6 to 9 years	787	59.0	24.8	20.5	0.8[a]	49.1	20.3	8.7	7.3	16.8	15.5
6 to 11 years	1,031	56.5	25.2	21.6	1.1[a]	44.2	18.2	8.0	6.6	15.4	12.7
12 to 19 years	737	44.5	24.7	21.7	1.0[a]	27.1	8.2	6.0	4.1	7.1	8.2
Females											
6 to 9 years	704	64.9	27.9	22.3	1.5[a]	50.4	17.3	8.8	7.4	20.4	17.3
6 to 11 years	969	62.1	27.7	21.5	1.1[a]	47.2	16.2	7.3	7.4	19.0	14.9
12 to 19 years	732	45.6	22.4	18.1	1.1[a]	30.2	8.2	4.4	6.0	11.3	9.7
Males and Females											
9 years and under	9,309	68.3	25.2	19.8	2.5	58.0	20.9	14.0	7.1	20.6	26.7
19 years and under	11,287	57.8	24.8	20.1	1.8	44.4	15.2	9.7	6.2	15.5	17.9

[a] Estimate is not statistically reliable due to small samples size reporting intake.
Note: Percentages shown are representative of the first day of each participant's survey response.

Source: USDA, 1999.

Table 9-11. Quantity (as consumed) of Fruits and Vegetables Consumed Per Eating Occasion and Percentage of Individuals Using These Foods in Two Days

Food category	Quantity consumed per eating occasion (grams)											
	2 to 5 years			6 to 11 years			12 to 19 years					
	Male and Female (N = 2,109)			Male and Female (N = 1,432)			Male (N = 696)			Female (N = 702)		
	PC	Mean.	SEM	PC	Mean	SEM	PC	Mean	SEM	PC	Mean	SEM
Raw Vegetables												
Carrots	10.4	27	2	17.8	32	2	9.2	35	6	11.9	32	4
Cucumbers	6.4	32	4	6.6	39	6	6.1	71[a]	22[a]	6.8	48	11
Lettuce	34.0	17	1	40.8	26	1	56.0	32	3	52.3	34	2
Onions	3.9	9	2	4.5	17	2	11.1	28	4	7.9	23	4
Tomatoes	14.8	31	2	14.0	42	4	25.7	49	5	23.9	44	3
Cooked Vegetables												
Beans (string)	16.8	50	2	12.1	71	6	8.3	85	9	7.6	78	5
Broccoli	7.2	61	3	5.6	102	16	3.9	127[a]	17[a]	5.7	109[a]	14[a]
Carrots	6.0	48	4	3.8	46	5	2.8	81[a]	16[a]	2.1	75[a]	17[a]
Corn	18.9	68	3	22.2	79	4	12.8	125	9	12.3	100	6
Peas	8.4	48	3	6.8	72	9	3.6	115[a]	15[a]	2.4	93[a]	17[a]
Potatoes (French-fried)	32.7	52	1	33.7	67	2	41.7	97	3	38.1	81	4
Potatoes (home-fried and hash-browned)	9.3	85	5	10.1	93	6	10.1	145	13	6.1	138	13
Potatoes (baked)	7.6	70	4	8.2	95	6	8.6	152	15	8.8	115	10
Potatoes (boiled)	4.8	81	9	2.7	103[a]	17[a]	2.0	250[a]	40[a]	3.2	144[a]	16[a]
Potatoes (mashed)	14.8	118	6	13.3	162	12	14.6	245	16	11.9	170	17
Fruits												
Apples (raw)	26.8	106	2	21.9	123	3	11.7	149	9	12.4	129	5
Apples (cooked and applesauce)	10.1	118	5	9.0	130	7	2.3	153[a]	19[a]	2.6	200[a]	47[a]
Apple juice	26.3	207	5	12.2	223	10	7.8	346	22	8.5	360	44
Bananas (raw)	25.0	95	2	16.5	105	3	10.3	122	6	8.4	119	5
Oranges (raw)	11.1	103	5	10.5	114	5	4.3	187[a]	38[a]	5.4	109[a]	8[a]
Orange juice	34.4	190	4	30.9	224	6	30.8	354	16	29.5	305	11

[a] Indicates a statistic that is potentially unreliable because of small sample size or large coefficient of variation
PC = Percent consuming at least once in 2 days.
SEM = Standard error of the mean.

Source: Smiciklas-Wright et al., 2002 (based on 1994-1996 CSFII data).

Table 9-12. Characteristics of the FITS Sample Population

	Sample Size	Percentage of Sample
Gender		
Male	1,549	51.3
Female	1,473	48.7
Age of Child		
4 to 6 months	862	28.5
7 to 8 months	483	16.0
9 to 11 months	679	22.5
12 to 14 months	374	12.4
15 to 18 months	308	10.2
19 to 24 months	316	10.4
Child's Ethnicity		
Hispanic or Latino	367	12.1
Non-Hispanic or Latino	2,641	87.4
Missing	14	0.5
Child's Race		
White	2,417	80.0
Black	225	7.4
Other	380	12.6
Urbanicity		
Urban	1,389	46.0
Suburban	1,014	33.6
Rural	577	19.1
Missing	42	1.3
Household Income		
Under $10,000	48	1.6
$10,000 to $14,999	48	1.6
$15,000 to $24,999	221	7.3
$25,000 to $34,999	359	11.9
$35,000 to $49,999	723	23.9
$50,000 to $74,999	588	19.5
$75,000 to $99,999	311	10.3
$100,000 and Over	272	9.0
Missing	452	14.9
Receives WIC		
Yes	821	27.2
No	2,196	72.6
Missing	5	0.2
Sample Size (Unweighted)	3,022	100.0

WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

Source: Devaney et al., 2004.

Table 9-13. Percentage of Infants and Toddlers Consuming Different Types of Vegetables

Food Group/Food	Percentage of Infants and Toddlers Consuming at Least Once in a Day					
	4 to 6 months	7 to 8 months	9 to 11 months	12 to 14 months	15 to 18 months	19 to 24 months
Any Vegetable	39.9	66.5	72.6	76.5	79.2	81.6
Baby Food Vegetables	35.7	54.5	34.4	12.7	3.0	1.6
Cooked Vegetables	5.2	17.4	45.9	66.3	72.9	75.6
Raw Vegetables	0.5	1.6	5.5	7.9	14.3	18.6
Types of Vegetables[a]						
Dark Green Vegetables[b]	0.1	2.9	4.2	5.0	10.4	7.8
Deep Yellow Vegetables[c]	26.5	39.3	29.0	24.0	13.6	13.4
White Potatoes	3.6	12.4	24.1	33.2	42.0	40.6
French Fries and Other Fried Potatoes	0.7	2.9	8.6	12.9	19.8	25.5
Other Starchy Vegetables[d]	6.5	10.9	16.9	17.3	20.8	24.2
Other Vegetables	11.2	25.9	35.1	39.1	45.6	43.3

[a] Totals include commercial baby food, cooked vegetables, and raw vegetables.
[b] Reported dark green vegetables include broccoli, spinach and other greens, and romaine lettuce.
[c] Reported deep yellow vegetables include carrots, pumpkin, sweet potatoes, and winter squash.
[d] Reported starchy vegetables include corn, green peas, immature lima beans, black-eyed peas (not dried), cassava, and rutabaga.

Source: Fox et al., 2004.

Table 9-14. Top Five Vegetables Consumed by Infants and Toddlers

Top Vegetables by Age Group[a]	Percentage Consuming at Least Once in a Day
4 to 6 months	
Baby Food Carrots	9.6
Baby Food Sweet Potatoes	9.1
Baby Food Squash	8.1
Baby Food Green Beans	7.2
Baby Food Peas	5.0
7 to 8 months	
Baby Food Carrots	14.2
Baby Food Sweet Potatoes	12.9
Baby Food Squash	12.9
Baby Food Green Beans	11.2
Baby Food Mixed/Garden Vegetables	10.1
9 to 11 months	
Cooked Green Beans	9.7
Mashed/Whipped Potatoes	9.0
French Fries/Other Fried Potatoes	8.6
Baby Food Mixed/Garden Vegetables	8.4
Cooked Carrots	8.0
12 to 14 months	
Cooked Green Beans	18.2
French Fries/Other Fried Potatoes	12.9
Cooked Carrots	11.5
Mashed/Whipped Potatoes	10.3
Cooked Peas	8.4
15 to 18 months	
French Fries/Other Fried Potatoes	19.8
Cooked Green Beans	16.7
Cooked Peas	13.9
Cooked Tomatoes/Tomato Sauce	13.7
Mashed/Whipped Potatoes	12.4
19 to 24 months	
French Fries/Other Fried Potatoes	25.5
Cooked Green Beans	16.8
Cooked Corn	15.2
Cooked Peas	11.4
Cooked Tomatoes/Tomato Sauce	9.4

[a] Baby food vegetables include single vegetables (majority of vegetables reported) as well as mixtures with the named vegetables the predominant vegetable, e.g., broccoli and cauliflower or broccoli and carrots.

Source: Fox et al., 2004.

Table 9-15. Percentage of Infants and Toddlers Consuming Different Types of Fruits

Food Group/Food	Percentage of Infants and Toddlers Consuming at Least Once in a Day					
	4 to 6 months	7 to 8 months	9 to 11 months	12 to 14 months	15 to 18 months	19 to 24 months
Any Fruit	41.9	75.5	75.8	77.2	71.8	67.3
Baby Food Fruit	39.1	67.9	44.8	16.2	4.2	1.8
Non-baby Food Fruit	5.3	14.3	44.2	67.1	69.4	66.8
Types of Non-baby Food Fruit						
Canned Fruit	1.4	5.8	21.6	31.9	25.1	20.2
Packed in Syrup	0.7	0.7	8.1	14.9	12.7	8.1
Packed in Juice or Water	0.7	4.5	13.5	18.5	11.3	11.4
Unknown Pack	0.0	0.7	1.5	1.2	3.1	1.2
Fresh Fruit	4.4	9.5	29.5	52.1	55.0	54.6
Dried Fruit	0.0	0.4	2.1	3.5	7.1	9.4
Types of Fruit[a]						
Apples	18.6	33.1	31.6	27.5	19.8	22.4
Bananas	16.0	30.6	34.5	37.8	32.4	30.0
Berries	0.1	0.6	5.3	6.6	11.3	7.7
Citrus Fruits	0.2	0.4	1.6	4.9	7.3	5.1
Melons	0.6	1.0	4.4	7.3	7.2	9.6

[a] Totals include all baby food and non-baby food fruits.

Source: Fox et al., 2004.

Table 9-16. Top Five Fruits Consumed by Infants and Toddlers	
Top Fruits by Age Group[a]	Percentage Consuming at Least Once in a Day
4 to 6 months	
Baby Food Applesauce	17.5
Baby Food Bananas	13.0
Baby Food Pears	7.5
Baby Food Peaches	7.4
Fresh Banana	0.3
7 to 8 months	
Baby Food Applesauce	29.0
Baby Food Bananas	25.2
Baby Food Pears	18.2
Baby Food Peaches	13.1
Fresh Banana	6.6
9 to 11 months	
Fresh Banana	19.0
Baby Food Applesauce	17.7
Baby Food Bananas	16.8
Baby Food Pears	12.4
Canned Applesauce	11.1
12 to 14 months	
Fresh Banana	33.0
Canned Applesauce	15.2
Fresh Grapes	9.0
Fresh Apple	8.8
Canned Peaches	7.2
Canned Fruit Cocktail	7.2
15 to 18 Months	
Fresh Banana	30.5
Fresh Grapes	13.2
Fresh Apple	11.2
Fresh Strawberries	10.6
Canned peaches	8.9
19 to 24 months	
Fresh Banana	29.6
Fresh Apple	15.0
Fresh Grapes	11.2
Raisins	9.0
Fresh Strawberries	7.6

[a] Baby food fruits include single fruits (majority of fruits reported) as well as mixtures with the named fruit as the predominant fruit, e.g., pears and raspberries or prunes with pears. Baby food fruits with tapioca and other baby food dessert fruits were counted as desserts.

Source: Fox et al., 2004.

Table 9-17. Characteristics of WIC Participants and Non-participants[a] (Percentages)

	Infants 4 to 6 months		Infants 7 to 11 months		Toddlers 12 to 24 months	
	WIC Participant	Non-participant	WIC Participant	Non-participant	WIC Participant	Non-participant
Gender						
Male	55	54	55	51	57	52
Female	45	46	45	49	43	48
Child's Ethnicity		**		**		**
Hispanic or Latino	20	11	24	8	22	10
Non-Hispanic or Latino	80	89	76	92	78	89
Child's Race		**		**		**
White	63	84	63	86	67	84
Black	15	4	17	5	13	5
Other	22	11	20	9	20	11
Child In Day Care				**		*
Yes	39	38	34	46	43	53
No	61	62	66	54	57	47
Age of Mother		**		**		**
14 to 19	18	1	13	1	9	1
20 to 24	33	13	38	11	33	14
25 to 29	29	29	23	30	29	26
30 to 34	9	33	15	36	18	34
35 or Older	9	23	11	21	11	26
Missing	2	2	1	1	0	1
Mother's Education		**		**		**
11th Grade or Less	23	2	15	2	17	3
Completed High School	35	19	42	20	42	19
Some Postsecondary	33	26	32	27	31	28
Completed College	7	53	9	51	9	48
Missing	2	1	2	0	1	2
Parent's Marital Status		**		**		**
Married	49	93	57	93	58	88
Not Married	50	7	42	7	41	11
Missing	1	1	1	0	1	1

Table 9-17. Characteristics of WIC Participants and Non-participants[a] (Percentages) (continued)

	Infants 4 to 6 months		Infants 7 to 11 months		Toddlers 12 to 24 months	
	WIC Participant	Non-participant	WIC Participant	Non-participant	WIC Participant	Non-participant
Mother or Female Guardian Works				**		*
Yes	46	51	45	60	55	61
No	53	48	54	40	45	38
Missing	1	1	1	0	0	1
Urbanicity		**		**		**
Urban	34	55	37	50	35	48
Suburban	36	31	31	34	35	35
Rural	28	13	30	15	28	16
Missing	2	1	2	1	2	2
Sample Size (Unweighted)	265	597	351	808	205	791

[a] X^2 test were conducted to test for statistical significance in the differences between WIC participants and non-participants within each age group for each variable. The results of X^2 test are listed next to the variable under the column labeled non-participants for each of the three age groups. * P<0.05; ** P>0.01; non-participants significantly different from WIC participants on the variable.

WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

Source: Ponza et al., 2004.

Table 9-18. Food Choices for Infants and Toddlers by WIC Participation Status

	Infants 4 to 6 months		Infants 7 to 11 months		Toddlers 12 to 24 months	
	WIC Participant	Non-participant	WIC Participant	Non-participant	WIC Participant	Non-participant
Vegetables						
Any Vegetable	40.2	39.8	68.2	70.7	77.5	80.2
Baby Food Vegetables	32.9	37.0	38.2	45.0	4.8	4.7
Cooked Vegetables	8.0	3.9*	33.8	33.8	73.1	72.3
Raw Vegetables	1.4	0.1**	3.6	4.1	11.8	15.4
Dark Green Vegetables	0.4	0.0	2.9	4.0	6.3	8.4
Deep Yellow Vegetables	23.2	28.1	30.1	34.8	12.5	16.9
Other Starchy Vegetables	6.5	6.4	12.9	15.2	21.1	21.5
Potatoes	6.0	2.4*	20.7	18.2	43.1	38.3
Fruits						
Any Fruit	47.8	39.2*	64.7	81.0**	58.5	74.6**
Baby Food Fruits	43.8	36.9	48.4	57.4*	3.8	6.5
Non-Baby Food Fruit	8.1	4.0	22.9	35.9**	56.4	70.9**
Fresh Fruit	5.4	3.8	14.3	24.3**	43.6	57.0**
Canned Fruit	3.4	0.5**	10.3	17.3**	22.3	25.3
Sample Size (unweighted)	265	597	351	808	205	791

* = P<0.05 non-participants significantly different from WIC participants.
** = P<0.01 non-participants significantly different from WIC participants.
WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

Source: Ponza et al. 2004.

Table 9-19. Percentage of Hispanic and Non-Hispanic Infants and Toddlers Consuming Different Types of Fruits and Vegetables on A Given Day

	Age 4 to 5 months		Age 6 to 11 months		Age 12 to 24 months	
	Hispanic (n=84)	Non-Hispanic (n=538)	Hispanic (n=163)	Non-Hispanic (n=1,228)	Hispanic (n=124)	Non-Hispanic (n=871)
Fruits						
Any Fruit or 100% Fruit Juice	45.0	35.9	86.2	86.8	84.6	87.2
Any Fruit[a]	39.4	28.8	68.1	76.0	67.6	71.5
100% Fruit Juice	19.3	15.3	57.8	47.7	64.1	58.9
Fruit Preparation						
Baby Food Fruit	32.6	28.4	42.9*	58.1	5.6†	6.3
Non-Baby Food Fruit	9.1†	1.3†	35.8	27.4	64.2	68.0
Canned Fruit	2.3†	-	8.8	13.7	12.1**	26.2
Fresh Fruit	9.1*†	-	30.0**	17.7	59.3	53.1
Vegetables						
Any Vegetable or 100% Vegetable Juice[b]	30.0	27.3	66.2	70.3	76.0	80.5
Type of Preparation	25.7	25.4	34.4*	47.6	4.1†	4.9
Baby Food Vegetables	4.2†	2.4†	33.2	29.4	71.4	72.9
Cooked Vegetables	2.3†	-	8.3†	2.6	25.0	13.1
Raw Vegetables						
Types of Vegetables[b]	-	-	3.3†	3.1	11.4†	7.5
Dark Green Vegetables[c]	21.0	18.2	32.2	25.9	20.0	15.4
Deep Yellow Vegetables[d]						
Starchy Vegetable:	1.4†	2.3†	20.7	17.4	43.5	39.0
White Potatoes	-	-	5.7†	5.3	23.4	20.3
French Fries/Fried Potatoes	-	-	14.4†	10.7	19.8	17.7
Baked/Mashed	5.0†	4.0	6.7**	15.1	16.6	22.2
Other Starchy Vegetables[e]	8.1†	8.0	28.5	29.0	42.0	43.4
Other Non-starchy Vegetables[f]						

[a] Total includes all baby food and non-baby food fruits and excludes 100% fruit juices and juice drinks.
[b] Total includes commercial baby food, cooked vegetables, raw vegetables, and 100% vegetable juices.
[c] Reported dark green vegetables include broccoli, spinach, romaine lettuce and other greens such as kale.
[d] Reported yellow vegetables include carrots, pumpkin, sweet potatoes, and winter squash.
[e] Reported starchy vegetables include corn, green peas, immature lima beans, black-eyed peas (not dried), cassava, and rutabaga. Corn is also shown as a subcategory of other starchy vegetables.
[f] Reported non-starchy vegetables include asparagus, cauliflower, cabbage, onions, green beans, mixed vegetables, peppers, and tomatoes.
- = Less than 1 percent of the group consumed this food on a given day.
* = Significantly different from non-Hispanic at the $P<0.05$.
** = Significantly different from non-Hispanic at the $P>0.01$.
† = Statistic is potentially unreliable because of a high coefficient of variation.

Source: Mennella et al., 2006.

Table 9-20. Top Five Fruits and Vegetables Consumed by Hispanic and Non-Hispanic Infants and Toddlers Per Age Group [a]

	Ethnicity	
	Hispanic	Non-Hispanic
Top Fruits By Age Group		
4 to 5 months	Bananas (16.3%) Apples (14.7%) Peaches (10.9%) Melons (3.5%) Pears (2.5%)	Apples (12.5%) Bananas (10.0%) Pears (5.9%) Peaches (5.8%) Prunes (1.6%)
6 to 11 months	Bananas (35.9%) Apples (29.7%) Pears (15.2%) Peaches (11.7%) Melons (4.7%)	Apples (32.9%) Bananas (31.5%) Pears (17.5%) Peaches (13.9%) Apricots (3.7%)
12 to 24 months	Bananas (41.5%) Apples (25.7%) Berries (8.5%) Melons (7.6%) Pears (7.3%)	Bananas (30.9%) Apples (22.0%) Grapes (12.3%) Peaches (9.6%) Berries (8.7%)
Top Vegetables By Age Group		
4 to 5 months	Carrots (9.9%) Sweet Potatoes (6.8%) Green Beans (5.8%) Peas (5.0%) Squash (4.3%)	Sweet Potatoes (7.5%) Carrots (6.6%) Green Beans (5.9%) Squash (5.4%) Peas (3.8%)
6 to 11 months	Potatoes (20.7%) Carrots (19.0%) Mixed Vegetables (11.1%) Green Beans (11.0%) Sweet Potatoes (8.7%)	Carrots (17.5%) Potatoes (16.4%) Green Beans (15.9%) Squash (11.8%) Sweet Potatoes (11.4%)
12 to 24 months	Potatoes (43.5%) Tomatoes (23.1%) Carrots (18.6%) Onions (11.8%) Corn (10.2%)	Potatoes (39.0%) Green Beans (19.6%) Peas (12.8%) Carrots (12.3%) Tomatoes (11.9%)

[a] Percentage consuming at least one in a day is in parentheses.

Source: Mennella, et al., 2006.

Table 9-21. Average Portion Sizes per Eating Occasion of Fruits and Vegetables Commonly Consumed by Infants from the 2002 Feeding Infants and Toddlers Study

Food group	Reference unit	4 to 5 months (N=624)	6 to 8 months (N=708)	9 to 11 months (N=687)
		Mean± SEM		
Fruits and Juices				
All fruits	tablespoon	3.6±0.19	4.7±0.11	5.8±0.17
Baby food fruit	tablespoon	3.3±0.16	4.6±0.11	5.6±0.17
Baby food peaches	tablespoon	3.6±0.37	4.4±0.26	5.3±0.36
Baby food pears	tablespoon	3.5±0.46	4.5±0.21	6.0±0.40
Baby food bananas	tablespoon	3.4±0.23	5.0±0.21	5.9±0.35
Baby food applesauce	tablespoon	3.7±0.29	4.6±0.17	5.6±0.25
Canned fruit	tablespoon	-	4.5±0.59	4.8±0.25
Fresh fruit	tablespoon	-	5.3±0.52	6.4±0.37
100% juice	fluid ounce	2.5±0.17	2.8±0.11	3.1±0.09
Apple/apple blends	fluid ounce	2.7±0.22	2.9±0.13	3.2±0.11
Grape	fluid ounce	-	2.6±0.19	3.1±0.21
Pear	fluid ounce	-	2.6±0.29	3.1±0.28
Vegetables				
All vegetables	tablespoon	3.8±0.20	5.8±0.16	5.6±0.20
Baby food vegetables	tablespoon	4.0±0.20	5.9±0.16	6.6±0.21
Baby food green beans	tablespoon	3.5±0.33	5.1±0.28	6.1±0.50
Baby food squash	tablespoon	4.3±0.47	5.6±0.30	6.9±0.41
Baby food sweet	tablespoon	4.3±0.31	6.1±0.34	7.2±0.69
Baby food carrots	tablespoon	3.5±0.33	5.6±0.27	6.7±0.48
Cooked vegetables, excluding french fries	tablespoon	-	4.2±0.47	3.8±0.31
Deep yellow vegetables	tablespoon	-	3.2±0.59	3.2±0.39
Mashed potatoes	tablespoon	-	4.1±0.67	2.8±0.37
Green beans	tablespoon	-	3.2±0.62	5.0±0.61

\- = Cell size was too small to generate a reliable estimate.
N = Number of respondents.
SEM = Standard error.

Source: Fox et al., 2006.

Table 9-22. Average Portion Sizes per Eating Occasion of Fruits and Vegetables Commonly Consumed by Toddlers from the 2002 Feeding Infants and Toddlers Study

Food group	Reference unit	12 to 14 months (N=371)	15 to 18 months (N=312)	19 to 24 months (N=320)
		Mean± SEM		
Fruits and Juices				
All fruits	cup	0.4±0.02	0.5±0.03	0.6±0.03
Canned fruit	cup	0.3±0.02	0.4±0.03	0.4±0.04
Fresh fruit	cup	0.4±0.02	0.5±0.03	0.6±0.03
Fresh apple	cup, slice	0.4±0.05	0.6±0.07	0.8+0.14
	1 medium	0.3±0.04	0.5±0.06	0.6±0.11
Fresh banana	cup, slice	0.4+0.02	0.5±0.03	0.5±0.03
	1 medium	0.6±0.03	0.7±0.03	0.7±0.04
Fresh grapes	cup	0.2±0.01	0.3±0.03	0.3±0.02
100% juice	fluid ounce	3.7±0.15	5.0±0.20	5.1±0.18
Orange/orange blends	fluid ounce	3.3+0.38	4.5±0.33	5.2±0.35
Apple/apple blends	fluid ounce	3.6±0.21	4.5±0.29	4.9±0.27
Grape	fluid ounce	3.6±0.38	5.6±0.43	4.7±0.31
Vegetables				
All vegetables	cup	0.4±0.02	0.4±0.03	0.4±0.02
Cooked vegetables, excluding french fries	cup	0.3±0.03	0.3±0.03	0.3±0.02
Deep yellow vegetables	cup	0.2±0.03	0.3±0.05	0.3±0.05
Corn	cup	0.2±0.03	0.2±0.03	0.2±0.03
Peas	cup	0.2±0.02	0.2±0.02	0.2±0.02
Green beans	cup	0.4±0.05	0.4±0.05	0.3±0.03
Mashed potatoes	cup	0.3±0.05	0.4±0.05	0.3±0.05
Baked, boiled potatoes	cup	0.3±0.05	0.4±0.06	-
French fries	cup	0.4±0.05	0.6±0.05	0.6±0.05

\- Cell size too small to generate reliable estimate.
N = Number of respondents.
SEM = Standard error of the mean.

Source: Fox et al., 2006.

Table 9-23. Mean Moisture Content of Selected Food Groups Expressed as Percentages of Edible Portions

Food	Moisture Content		Comments
	Raw	Cooked	
Fruits			
Apples - dried	31.76	84.13*	sulfured; * without added sugar
Apples	85.56* 86.67**		*with skin **without skin
Apples - juice		87.93	canned or bottled
Applesauce		88.35*	*unsweetened
Apricots	86.35	86.62*	*canned juice pack with skin
Apricots - dried	30.09	75.56*	sulfured; *without added sugar
Bananas	74.91		
Blackberries	88.15		
Blueberries	84.21	86.59*	*frozen unsweetened
Boysenberries	85.90		frozen unsweetened
Cantaloupes	90.15		
Casabas	91.85		
Cherries - sweet	82.25	84.95*	*canned, juice pack
Crabapples	78.94		
Cranberries	87.13		
Cranberries - juice cocktail	85.00		bottled
Currants (red and white)	83.95		
Elderberries	79.80		
Grapefruit (pink, red and white)	90.89		
Grapefruit - juice	90.00	90.10*	*canned unsweetened
Grapefruit - unspecified	90.89		pink, red, white
Grapes - fresh	81.30		American type (slip skin)
Grapes - juice	84.12		canned or bottled
Grapes - raisins	15.43		seedless
Honeydew melons	89.82		
Kiwi fruit	83.07		
Kumquats	80.85		
Lemons - juice	90.73	92.46*	*canned or bottled
Lemons - peel	81.60		
Lemons - pulp	88.98		
Limes	88.26		
Limes - juice	90.79	92.52*	*canned or bottled
Loganberries	84.61*		*frozen
Mulberries	87.68		
Nectarines	87.59		
Oranges - unspecified	86.75		all varieties
Peaches	88.87	87.49*	*canned juice pack
Pears - dried	26.69	64.44*	sulfured; *without added sugar
Pears - fresh	83.71	86.47*	*canned juice pack
Pineapple	86.00	83.51*	*canned juice pack
Pineapple - juice		86.37	canned

Table 9-23. Mean Moisture Content of Selected Food Groups Expressed as Percentages of Edible Portions (continued)

Food	Moisture Content		Comments
	Raw	Cooked	
Plums - dried (prunes)	30.92		
Plums	87.23	84.02*	*canned juice pack
Quinces	83.80		
Raspberries	85.75		
Strawberries	90.95	89.97*	*frozen unsweetened
Tangerine - juice	88.90	87.00*	*canned sweetened
Tangerines	85.17	89.51*	*canned juice pack
Watermelon	91.45		
Vegetables			
Alfalfa seeds - sprouted	92.82		
Artichokes - globe & French	84.94	84.08	boiled, drained
Artichokes - Jerusalem	78.01		
Asparagus	93.22	92.63	boiled, drained
Bamboo shoots	91.00	95.92	boiled, drained
Beans - dry - blackeye peas (cowpeas)	77.20	75.48	boiled, drained
Beans - dry - hyacinth (mature seeds)	87.87	86.90	boiled, drained
Beans - dry - navy (mature seeds)	79.15	76.02	boiled, drained
Beans - dry - pinto (mature seeds)	81.30	93.39	boiled, drained
Beans - lima	70.24	67.17	boiled, drained
Beans - snap - green - yellow	90.27	89.22	boiled, drained
Beets	87.58	87.06	boiled, drained
Beets - tops (greens)	91.02	89.13	boiled, drained
Broccoli	90.69	89.25	boiled, drained
Brussel sprouts	86.00	88.90	boiled, drained
Cabbage - Chinese (pak-choi)	95.32	95.55	boiled, drained
Cabbage - red	90.39	90.84	boiled, drained
Cabbage - savoy	91.00	92.00	boiled, drained
Carrots	88.29	90.17	boiled, drained
Cassava (yucca blanca)	59.68		
Cauliflower	91.91	93.00	boiled, drained
Celeriac	88.00	92.30	boiled, drained
Celery	95.43	94.11	boiled, drained
Chives	90.65		
Cole slaw	81.50		
Collards	90.55	91.86	boiled, drained
Corn - sweet	75.96	69.57	boiled, drained
Cress - garden	89.40	92.50	boiled, drained
Cucumbers - peeled	96.73		
Dandelion - greens	85.60	89.80	boiled, drained
Eggplant	92.41	89.67	boiled, drained
Endive	93.79		
Garlic	58.58		
Kale	84.46	91.20	boiled, drained
Kohlrabi	91.00	90.30	boiled, drained

Table 9-23. Mean Moisture Content of Selected Food Groups Expressed as Percentages of Edible Portions (continued)

Food	Moisture Content		Comments
	Raw	Cooked	
Lambsquarter	84.30	88.90	boiled, drained
Leeks - bulb and lower leaf-portion	83.00	90.80	boiled, drained
Lentils - sprouted	67.34	68.70	stir-fried
Lettuce - iceberg	95.64		
Lettuce - cos or romaine	94.61		
Mung beans - mature seeds (sprouted)	90.40	93.39	boiled, drained
Mushrooms - unspecified		91.08	boiled, drained
Mushrooms - oyster	88.80		
Mushrooms - Maitake	90.53		
Mushrooms - portabella	91.20		
Mustard greens	90.80	94.46	boiled, drained
Okra	90.17	92.57	boiled, drained
Onions	89.11	87.86	boiled, drained
Onions - dehydrated or dried	3.93		
Parsley	87.71		
Parsnips	79.53	80.24	boiled, drained
Peas - edible-podded	88.89	88.91	boiled, drained
Peppers - sweet - green	93.89	91.87	boiled, drained
Peppers - hot chili-green	87.74	92.50*	*canned solids & liquid
Potatoes (white)	81.58	75.43	baked
Pumpkin	91.60	93.69	boiled, drained
Radishes	95.27		
Rutabagas - unspecified	89.66	88.88	boiled, drained
Salsify (vegetable oyster)	77.00	81.00	boiled, drained
Shallots	79.80		
Soybeans - mature seeds - sprouted	69.05	79.45	steamed
Spinach	91.40	91.21	boiled, drained
Squash - summer	94.64	93.70	all varieties; boiled, drained
Squash - winter	89.76	89.02	all varieties; baked
Sweet Potatoes	77.28	75.78	baked in skin
Swiss chard	92.66	92.65	boiled, drained
Taro - leaves	85.66	92.15	steamed
Taro	70.64	63.80	
Tomatoes - juice		93.90	canned
Tomatoes - paste		73.50	canned
Tomatoes - puree		87.88	canned
Tomatoes	93.95		
Towelgourd	93.85	84.29	boiled, drained
Turnips	91.87	93.60	boiled, drained
Turnips - greens	89.67	93.20	boiled, drained
Water chestnuts - Chinese	73.46	86.42*	*canned solids and liquids
Yambean - tuber	90.07	90.07	boiled, drained

Source: USDA, 2007.

APPENDIX 9A

CODES AND DEFINITIONS USED TO DETERMINE THE VARIOUS FRUITS AND VEGETABLES USED IN THE U.S. EPA ANALYSIS OF CSFII DATA IN FCID

Table 9A-1. Food Codes and Definitions Used in Analysis of the 1994-96, 1998 USDA CSFII Data

Food Category	EPA Food Commodity Codes	
TOTAL FRUITS AND VEGETABLES		
Total Fruits	95000010 Acerola	95001930 Jackfruit
	11000090 Apple, dried	95001950 Kiwifruit
	11000091 Apple, dried-babyfood	10001970 Kumquat
	11000070 Apple, fruit with peel	10001990 Lemon
	11000080 Apple, peeled fruit	10002010 Lemon, peel
	11000081 Apple, peeled fruit-babyfood	10002060 Lime
	11000110 Apple, sauce	13012080 Loganberry
	11000111 Apple, sauce-babyfood	95002090 Longan
	12000120 Apricot	11002100 Loquat
	12000130 Apricot, dried	95002110 Lychee
	12000121 Apricot-babyfood	95002120 Lychee, dried
	95000200 Avocado	95002140 Mamey apple
	95000230 Banana	95002150 Mango
	95000240 Banana, dried	95002160 Mango, dried
	95000241 Banana, dried-babyfood	95002151 Mango-babyfood
	95000231 Banana-babyfood	95002270 Mulberry
	13010550 Blackberry	12002300 Nectarine
	13020570 Blueberry	10002400 Orange
	13020571 Blueberry-babyfood	10002420 Orange, peel
	13010580 Boysenberry	95002450 Papaya
	95000600 Breadfruit	95002460 Papaya, dried
	95000740 Canistel	95002451 Papaya-babyfood
	95000890 Cherimoya	95002520 Passionfruit
	12000900 Cherry	95002521 Passionfruit-babyfood
	12000901 Cherry-babyfood	95002540 Pawpaw
	10001060 Citrus citron	12002600 Peach
	10001070 Citrus hybrids	12002610 Peach, dried
	95001120 Coconut, dried	12002611 Peach, dried-babyfood
	95001110 Coconut, meat	12002601 Peach-babyfood
	95001111 Coconut, meat-babyfood	11002660 Pear
	95001130 Coconut, milk	11002670 Pear, dried
	11001290 Crabapple	11002661 Pear-babyfood
	95001300 Cranberry	95002770 Persimmon
	95001310 Cranberry, dried	95002790 Pineapple
	95001301 Cranberry-babyfood	95002800 Pineapple, dried
	13021360 Currant	95002791 Pineapple-babyfood
	13021370 Currant, dried	95002830 Plantain
	95001410 Date	95002840 Plantain, dried
	13011420 Dewberry	12002850 Plum
	08001480 Eggplant	12002870 Plum, prune, dried
	13021490 Elderberry	12002871 Plum, prune, dried-babyfood
	95001510 Feijoa	12002860 Plum, prune, fresh
	95001530 Fig	12002861 Plum, prune, fresh-babyfood
	95001540 Fig, dried	12002851 Plum-babyfood
	13021740 Gooseberry	95002890 Pomegranate
	95001750 Grape	10003070 Pummelo
	95001780 Grape, raisin	11003100 Quince
	10001800 Grapefruit	13013200 Raspberry
	95001830 Guava	13013201 Raspberry-babyfood
	95001831 Guava-babyfood	95003330 Sapote, Mamey
	13021910 Huckleberry	95003460 Soursop
	95001920 Jaboticaba	95003510 Spanish lime

Table 9A-1. Food Codes and Definitions Used in Analysis of the 1994-96, 1998 USDA CSFII Data (continued)

Food Category	EPA Food Commodity Codes			
Total Fruits (continued)	95003580	Starfruit	95003610	Sugar apple
	95003590	Strawberry	95003680	Tamarind
	95003591	Strawberry-babyfood	10003690	Tangerine
Total Vegetables	18000020	Alfalfa, seed	09020880	Chayote, fruit
	04010050	Amaranth, leafy	06030990	Chickpea, flour
	01030150	Arrowroot, flour	06030980	Chickpea, seed
	01030151	Arrowroot, flour-babyfood	06030981	Chickpea, seed-babyfood
	95000160	Artichoke, globe	01011000	Chicory, roots
	01030170	Artichoke, Jerusalem	02001010	Chicory, tops
	04010180	Arugula	09021020	Chinese waxgourd
	95000190	Asparagus	19011030	Chive
	09020210	Balsam pear	04011040	Chrysanthemum, garland
	95000220	Bamboo, shoots	19021050	Cinnamon
	19010290	Basil, dried leaves	19021051	Cinnamon-babyfood
	19010291	Basil, dried leaves-babyfood	19011180	Coriander, leaves
	19010280	Basil, fresh leaves	19011181	Coriander, leaves-babyfood
	19010281	Basil, fresh leaves-babyfood	19021190	Coriander, seed
	06020330	Bean, cowpea, succulent	19021191	Coriander, seed-babyfood
	06030360	Bean, kidney, seed	04011380	Dandelion, leaves
	06030380	Bean, lima, seed	01031390	Dasheen, corm
	06020370	Bean, lima, succulent	02001400	Dasheen, leaves
	06030390	Bean, mung, seed	19011440	Dill
	06030400	Bean, navy, seed	19021430	Dill, seed
	06030410	Bean, pink, seed	04021520	Fennel, Florence
	06030420	Bean, pinto, seed	03001640	Garlic
	06010430	Bean, snap, succulent	03001650	Garlic, dried
	06010431	Bean, snap, succulent-babyfood	03001651	Garlic, dried-babyfood
	01010500	Beet, garden, roots	01031660	Ginger
	01010501	Beet, garden, roots-babyfood	01031670	Ginger, dried
	02000510	Beet, garden, tops	01031661	Ginger-babyfood
	95000540	Belgium endive	01011680	Ginseng, dried
	05010610	Broccoli	95001770	Grape, leaves
	05020630	Broccoli raab	06031820	Guar, seed
	05010620	Broccoli, Chinese	06031821	Guar, seed-babyfood
	05010611	Broccoli-babyfood	19011840	Herbs, other
	05010640	Brussels sprouts	19011841	Herbs, other-babyfood
	05010690	Cabbage	05021940	Kale
	05020700	Cabbage, Chinese, bok choy	05011960	Kohlrabi
	05010720	Cabbage, Chinese, mustard	03001980	Leek
	05010710	Cabbage, Chinese, napa	19012020	Lemongrass
	95000730	Cactus	04012040	Lettuce, head
	09010750	Cantaloupe	04012050	Lettuce, leaf
	04020760	Cardoon	19012200	Marjoram
	01010780	Carrot	19012201	Marjoram-babyfood
	01010781	Carrot-babyfood	08002340	Okra
	09010800	Casaba	03002370	Onion, dry bulb
	01030820	Cassava	03002380	Onion, dry bulb, dried
	01030821	Cassava-babyfood	03002381	Onion, dry bulb, dried-babyfood
	05010830	Cauliflower	03002371	Onion, dry bulb-babyfood
	01010840	Celeriac	03002390	Onion, green
	04020850	Celery	95002430	Palm heart, leaves
	04020851	Celery-babyfood	19012490	Parsley, dried leaves
	04020870	Celtuce	19012491	Parsley, dried leaves-babyfood

Table 9A-1. Food Codes and Definitions Used in Analysis of the 1994-96, 1998 USDA CSFII Data (continued)

Food Category	EPA Food Commodity Codes			
Total Vegetables (continued)	04012480	Parsley, leaves	01013270	Rutabaga
	01012500	Parsley, turnip rooted	01013310	Salsify, roots
	01012510	Parsnip	02003320	Salsify, tops
	01012511	Parsnip-babyfood	19013340	Savory 95003350 Seaweed
	06032560	Pea, dry	95003351	Seaweed-babyfood
	06032561	Pea, dry-babyfood	03003380	Shallot
	06012570	Pea, edible podded, succulent	06003480	Soybean, flour
	06032580	Pea, pigeon, seed	06003481	Soybean, flour-babyfood
	06022590	Pea, pigeon, succulent	06003470	Soybean, seed
	06022550	Pea, succulent	19023540	Spices, other
	06022551	Pea, succulent-babyfood	19023541	Spices, other-babyfood
	08002700	Pepper, bell	09023560	Squash, summer
	08002710	Pepper, bell, dried	09023561	Squash, summer-babyfood
	08002711	Pepper, bell, dried-babyfood	09023570	Squash, winter
	08002701	Pepper, bell-babyfood	09023571	Squash, winter-babyfood
	19022740	Pepper, black and white	01033660	Sweet potato
	19022741	Pepper, black and white-babyfood	01033661	Sweet potato-babyfood
	08002720	Pepper, nonbell	04023670	Swiss chard
	08002730	Pepper, nonbell, dried	01033710	Tanier, corm
	08002721	Pepper, nonbell-babyfood	08003740	Tomatillo
	95002750	Peppermint	08003750	Tomato
	01032960	Potato, chips	08003780	Tomato, dried
	01032970	Potato, dry (granules/ flakes)	08003781	Tomato, dried-babyfood
	01032971	Potato, dry (granules/ flakes)-babyfood	08003760	Tomato, paste
	01032980	Potato, flour	08003761	Tomato, paste-babyfood
	01032981	Potato, flour-babyfood	08003770	Tomato, puree
	01033000	Potato, tuber, w/o peel	08003771	Tomato, puree-babyfood
	01033001	Potato, tuber, w/o peel-babyfood	95003800	Tomato, Tree
	01032990	Potato, tuber, w/peel	08003751	Tomato-babyfood
	01032991	Potato, tuber, w/peel-babyfood	01033870	Turmeric
	09023080	Pumpkin	05023890	Turnip, greens
	04013130	Radicchio	01013880	Turnip, roots
	01013160	Radish, Oriental, roots	95003970	Water chestnut
	02003170	Radish, Oriental, tops	95003980	Watercress
	01013140	Radish, roots	09013990	Watermelon
	02003150	Radish, tops	01034070	Yam bean
	05023180	Rape greens	01034060	Yam, true
	04023220	Rhubarb		
INDIVIDUAL FRUIT CATEGORIES				
Apples	11000090	Apple, dried	11000080	Apple, peeled fruit
	11000091	Apple, dried-babyfood	11000081	Apple, peeled fruit-babyfood
	11000070	Apple, fruit with peel	11000110	Apple, sauce
	11000100	Apple, juice	11000111	Apple, sauce-babyfood
	11000101	Apple, juice-babyfood		
Bananas	95000230	Banana	95002830	Plantain
	95000240	Banana, dried	95002840	Plantain, dried
	95000241	Banana, dried-babyfood		
	95000231	Banana-babyfood		

Table 9A-1. Food Codes and Definitions Used in Analysis of the 1994-96, 1998 USDA CSFII Data (continued)

Food Category	EPA Food Commodity Codes			
Berries and Small Fruits	13010550	Blackberry	13021910	Huckleberry
	13010580	Boysenberry	95001300	Cranberry
	13011420	Dewberry	95001301	Cranberry-babyfood
	13012080	Loganberry	95001310	Cranberry, dried
	13013200	Raspberry	95001750	Grape
	13013201	Raspberry-babyfood	95001770	Grape, leaves
	13020570	Blueberry	95001780	Grape, raisin
	13020571	Blueberry-babyfood	95001950	Kiwifruit
	13021360	Currant	95002270	Mulberry
	13021370	Currant, dried	95003590	Strawberry
	13021490	Elderberry	95003591	Strawberry-babyfood
	13021740	Gooseberry		
Citrus Fruits	10001060	Citrus citron	10002060	Lime
	10001070	Citrus hybrids	10002400	Orange
	10001800	Grapefruit	10002420	Orange, peel
	10001970	Kumquat	10003070	Pummelo
	10001990	Lemon	10003690	Tangerine
	10002010	Lemon, peel		
Peaches	12002600	Peach		
	12002610	Peach, dried		
	12002611	Peach, dried-babyfood		
	12002601	Peach-babyfood		
Pears	11002660	Pear		
	11002670	Pear, dried		
	11002680	Pear, juice		
	11002681	Pear, juice-babyfood		
	11002661	Pear-babyfood		
Pome Fruits	11000070	Apple, fruit with peel	11001290	Crabapple
	11000080	Apple, peeled fruit	11002100	Loquat
	11000081	Apple, peeled fruit-babyfood	11002660	Pear
	11000090	Apple, dried	11002661	Pear-babyfood
	11000091	Apple, dried-babyfood	11002670	Pear, dried
	11000110	Apple, sauce	11003100	Quince
	11000111	Apple, sauce-babyfood		
Strawberries	95003590	Strawberry		
	95003591	Strawberry-babyfood		
Stone Fruits	12000120	Apricot	12002611	Peach, dried-babyfood
	12000121	Apricot-babyfood	12002850	Plum
	12000130	Apricot, dried	12002851	Plum-babyfood
	12000900	Cherry	12002860	Plum, prune, fresh
	12000901	Cherry-babyfood	12002861	Plum, prune, fresh-babyfood
	12002300	Nectarine	12002870	Plum, prune, dried
	12002600	Peach	12002871	Plum, prune, dried-babyfood
	12002601	Peach-babyfood		
	12002610	Peach, dried		

Table 9A-1. Food Codes and Definitions Used in Analysis of the 1994-96, 1998 USDA CSFII Data (continued)

Food Category	EPA Food Commodity Codes			
Tropical Fruits	95000010	Acerola	95002140	Mamey apple
	95000220	Avocado	95002150	Mango
	95000230	Banana	95002151	Mango-babyfood
	95000231	Banana-babyfood	95002160	Mango, dried
	95000240	Banana, dried	95002450	Papaya
	95000241	Banana, dried-babyfood	95002451	Papaya-babyfood
	95000600	Breadfruit	95002460	Papaya, dried
	95000740	Canistel	95002520	Passionfruit
	95000890	Cherimoya	95002521	Passionfruit-babyfood
	95001110	Coconut, meat	95002540	Pawpaw
	95001111	Coconut, meat-babyfood	95002790	Pineapple
	95001120	Coconut, dried	95002791	Pineapple-babyfood
	95001130	Coconut, milk	95002800	Pineapple, dried
	95001410	Date	95002830	Plantain
	95001510	Feijoa	95002840	Plantain, dried
	95001530	Fig	95002890	Pomegranate
	95001540	Fig, dried	95003330	Sapote, Mamey
	95001830	Guava	95003460	Soursop
	95001831	Guava-babyfood	95003510	Spanish lime
	95001930	Jackfruit	95003580	Starfruit
	95002090	Longan	95003610	Sugar apple
	95002110	Lychee	95003680	Tamarind
	95002120	Lychee, dried		
INDIVIDUAL VEGETABLE CATEGORIES				
Asparagus	95000190	Asparagus		
Beans	06030350	Bean, great northern, seed	06020370	Bean, lima, succulent
	06030300	Bean, black, seed	06030390	Bean, mung, seed
	06030320	Bean, broad, seed	06030400	Bean, navy, seed
	06020310	Bean, broad, succulent	06030410	Bean, pink, seed
	06030340	Bean, cowpea, seed	06030420	Bean, pinto, seed
	06020330	Bean, cowpea, succulent	06010430	Bean, snap, succulent
	06030360	Bean, kidney, seed	06010431	Bean, snap, succulent-babyfood
	06030380	Bean, lima, seed		
Beets	01010500	Beet, garden, roots		
	01010501	Beet, garden, roots-babyfood		
	02000510	Beet, garden, tops		
Broccoli	05010610	Broccoli		
	05010611	Broccoli-babyfood		
Bulb Vegetables	03001640	Garlic	03002371	Onion, dry bulb-babyfood
	03001650	Garlic, dried	03002380	Onion, dry bulb, dried
	03001651	Garlic, dried-babyfood	03002381	Onion, dry bulb, dried-babyfood
	03001980	Leek	03002390	Onion, green
	03002370	Onion, dry bulb	03003380	Shallot
Cabbage	05010690	Cabbage		
	05010720	Cabbage, Chinese, mustard		
	05010710	Cabbage, Chinese, napa		

Table 9A-1. Food Codes and Definitions Used in Analysis of the 1994-96, 1998 USDA CSFII Data (continued)

Food Category	EPA Food Commodity Codes			
Carrots	01010780	Carrot		
Corn	15001220	Corn, field, bran	15001231	Corn, field, starch-babyfood
	15001200	Corn, field, flour	15001260	Corn, pop
	15001201	Corn, field, flour-babyfood	15001270	Corn, sweet
	15001210	Corn, field, meal	15001271	Corn, sweet-babyfood
	15001211	Corn, field, meal-babyfood		
	15001230	Corn, field, starch		
Cucumbers	09021350	Cucumber		
Cucurbit Vegetables	09010750	Cantaloupe	09021350	Cucumber
	09010800	Casaba	09023080	Pumpkin
	09011870	Honeydew melon	09023090	Pumpkin, seed
	09013990	Watermelon	09023560	Squash, summer
	09020210	Balsam pear	09023561	Squash, summer-babyfood
	09020880	Chayote, fruit	09023570	Squash, winter
	09021020	Chinese waxgourd	09023571	Squash, winter-babyfood
Fruiting Vegetables	08001480	Eggplant	08003750	Tomato
	08002340	Okra	08003751	Tomato-babyfood
	08002700	Pepper, bell	08003760	Tomato, paste
	08002701	Pepper, bell-babyfood	08003761	Tomato, paste-babyfood
	08002710	Pepper, bell, dried	08003770	Tomato, puree
	08002711	Pepper, bell, dried-babyfood	08003771	Tomato, puree-babyfood
	08002720	Pepper, nonbell	08003780	Tomato, dried
	08002721	Pepper, nonbell-babyfood	08003781	Tomato, dried-babyfood
	08002730	Pepper, nonbell, dried		
	08003740	Tomatillo		
Leafy Vegetables (Brassica and Nonbrassica)	02000510	Beet, garden, tops	04021520	Fennel, Florence
	02001010	Chicory, tops	04023220	Rhubarb
	02001400	Dasheen, leaves	04023670	Swiss chard
	02003150	Radish, tops	05010610	Broccoli
	02003170	Radish, Oriental, tops	05010611	Broccoli-babyfood
	02003320	Salsify, tops	05010620	Broccoli, Chinese
	04010050	Amaranth, leafy	05010640	Brussels sprouts
	04010180	Arugula	05010690	Cabbage
	04011040	Chrysanthemum, garland	05010710	Cabbage, Chinese, napa
	04011330	Cress, garden	05010720	Cabbage, Chinese, mustard
	04011340	Cress, upland	05010830	Cauliflower
	04011380	Dandelion, leaves	05011960	Kohlrabi
	04011500	Endive	05020630	Broccoli raab
	04012040	Lettuce, head	05020700	Cabbage, Chinese, bok choy
	04012050	Lettuce, leaf	05021170	Collards
	04012480	Parsley, leaves	05021940	Kale
	04013130	Radicchio	05022290	Mustard greens
	04013550	Spinach	05023180	Rape greens
	04013551	Spinach-babyfood	05023890	Turnip, greens
	04020760	Cardoon	95000540	Belgium endive
	04020850	Celery	95003350	Seaweed
	04020851	Celery-babyfood	95003351	Seaweed - babyfood
	04020870	Celtuce	95003980	Watercress

Table 9A-1. Food Codes and Definitions Used in Analysis of the 1994-96, 1998 USDA CSFII Data (continued)

Food Category	EPA Food Commodity Codes			
Legume Vegetables	06003470	Soybean, seed	06030340	Bean, cowpea, seed
	06003480	Soybean, flour	06030350	Bean, great northern, seed
	06003481	Soybean, flour-babyfood	06030360	Bean, kidney, seed
	06003490	Soybean, soy milk	06030380	Bean, lima, seed
	06003491	Soybean, soy milk-babyfood or infant formula	06030390	Bean, mung, seed
			06030400	Bean, navy, seed
	06010430	Bean, snap, succulent	06030410	Bean, pink, seed
	06010431	Bean, snap, succulent-babyfood	06030420	Bean, pinto, seed
	06012570	Pea, edible podded, succulent	06030980	Chickpea, seed
	06020310	Bean, broad, succulent	06030981	Chickpea, seed-babyfood
	06020330	Bean, cowpea, succulent	06030990	Chickpea, flour
	06020370	Bean, lima, succulent	06031820	Guar, seed
	06022550	Pea, succulent	06031821	Guar, seed-babyfood
	06022551	Pea, succulent-babyfood	06032030	Lentil, seed
	06022590	Pea, pigeon, succulent	06032560	Pea, dry
	06030300	Bean, black, seed	06032561	Pea, dry-babyfood
	06030320	Bean, broad, seed	06032580	Pea, pigeon, seed
Lettuce	04012040	Lettuce, head		
	04012050	Lettuce, leaf		
Okra	08002340	Okra		
Onions	03002370	Onion, dry bulb		
	03002380	Onion, dry bulb, dried		
	03002381	Onion, dry bulb, dried-babyfood		
	03002371	Onion, dry bulb-babyfood		
	03002390	Onion, green		
Peas	06032560	Pea, dry	06022550	Pea, succulent
	06032561	Pea, dry-babyfood	06022551	Pea, succulent-babyfood
	06012570	Pea, edible podded, succulent		
	06032580	Pea, pigeon, seed		
	06022590	Pea, pigeon, succulent		
Peppers	08002700	Pepper, bell	08002730	Pepper, nonbell, dried
	08002710	Pepper, bell, dried	08002721	Pepper, nonbell-babyfood
	08002711	Pepper, bell, dried-babyfood		
	08002701	Pepper, bell-babyfood		
	08002720	Pepper, nonbell		
Pumpkin	09023080	Pumpkin		
	09023090	Pumpkin, seed		

Table 9A-1. Food Codes and Definitions Used in Analysis of the 1994-96, 1998 USDA CSFII Data (continued)

Food Category	EPA Food Commodity Codes			
Root and Tuber Vegetables	01030150	Arrowroot, flour	01012510	Parsnip
	01030151	Arrowroot, flour-babyfood	01012511	Parsnip-babyfood
	01030170	Artichoke, Jerusalem	01032960	Potato, chips
	01010500	Beet, garden, roots	01032970	Potato, dry (granules/ flakes)
	01010501	Beet, garden, roots-babyfood	01032971	Potato, dry (granules/ flakes)-babyfood
	02000510	Beet, garden, tops	01032980	Potato, flour
	01010520	Beet, sugar	01032981	Potato, flour-babyfood
	01010521	Beet, sugar-babyfood	01033000	Potato, tuber, w/o peel
	01010670	Burdock	01033001	Potato, tuber, w/o peel-babyfood
	01010780	Carrot	01032990	Potato, tuber, w/peel
	01010781	Carrot-babyfood	01032991	Potato, tuber, w/peel-babyfood
	01030820	Cassava	01013160	Radish, Oriental, roots
	01030821	Cassava-babyfood	01013140	Radish, roots
	01010840	Celeriac	01013270	Rutabaga
	01011000	Chicory, roots	01033660	Sweet potato
	01031390	Dasheen, corm	01033661	Sweet potato-babyfood
	01031660	Ginger	01033710	Tanier, corm
	01031670	Ginger, dried	01033870	Turmeric
	01031661	Ginger-babyfood	01013880	Turnip, roots
	01011680	Ginseng, dried	95003970	Water chestnut
	01011900	Horseradish	01034070	Yam bean
	01012500	Parsley, turnip rooted	01034060	Yam, true
Stalk and Stem Vegetable and Edible Fungi	95000160	Artichoke, globe		
	95000190	Asparagus		
	95000220	Bamboo, shoots		
	95002280	Mushroom		
	95002430	Palm heart, leaves		
Tomatoes	08003750	Tomato	08003770	Tomato, puree
	08003780	Tomato, dried	08003771	Tomato, puree-babyfood
	08003781	Tomato, dried-babyfood	08003751	Tomato-babyfood
	08003760	Tomato, paste		
	08003761	Tomato, paste-babyfood		
White Potatoes	01032960	Potato, chips	01033000	Potato, tuber, w/o peel
	01032970	Potato, dry (granules/ flakes)	01033001	Potato, tuber, w/o peel-babyfood
	01032971	Potato, dry (granules/ flakes)-babyfood	01032990	Potato, tuber, w/peel
	01032980	Potato, flour	01032991	Potato, tuber, w/peel-babyfood
	01032981	Potato, flour-babyfood		